Christ the King Diocesian HIgh School
Incoming Algebra 1
Summer Math Packet

This packet will help you review basic algebra concepts.

- Please show all your work. No work No Credit!!!
  (if you need more room use loose leaf paper to do your work and staple it to the corresponding worksheet)
- I have provided notes with worked examples to help you.
- Please join my Algebra 1 Summer Math Google Classroom by entering the following code: **fexxer6,** as I will include helpful videos there to help you complete these assignments.
- You will be expected to do a worksheet every week.
- Do not wait to do all of the worksheets at one time.
- This packet will be due Wednesday August 16, 2023

Proposed schedule

Worksheet		Date: Week of
Week 1	2-3 problems/day	June 5
Week 2	3 problems/day	June 12
Week 3	3 problems/day	June 19
Week 4	4 problems/day	June 26
Week 5	3 problems/day	July 3
Week 6	3-5 problems/day	July 10
Week 7	2-3 problems/day	July 17
Week 8	4-5 problems/day	July 24

Incoming Algebra 1 Summer Math Name_____ ID: 1

Week 1-Solving 2-Step/Multistep Equations (2-3 Problems/Day)

Solve each equation.

1) $9 - 9n = 117$

2) $-2v - 1 = -15$

3) $3 + \frac{b}{9} = 2$

4) $\frac{v}{5} - 10 = -7$

5) $3 + \frac{x}{5} = 5$

6) $5 - 3m = 35$

7) How old am I if 500 reduced by 3 times my age is 206?

8) You had $22 to spend on four avocados. After buying them you had $6. How much did each avocado cost?

Solve each equation.

9) $-3(1 - 7m) = -171$

10) $8(5v - 5) = 240$

11) $v + 2(-6v - 1) = -90$

12) $-311 = 1 - 8(6r - 3)$

13) $-b + 34 = 4(5b - 2)$

14) $4 - (1 + 8n) = 3 - 8n$

15) $5 + 7(8r - 5) = -30 - 7r$

16) $-3(7 - 6x) = 18 + 5x$

17) $1\frac{1}{4}v - \frac{1}{5}v = -\frac{21}{10}$

18) $2n - \frac{1}{2}n = 6\frac{9}{10}$

19)

What is the solution to this equation?

$$\frac{3}{4}x \div 7 = \frac{x}{4} - 8$$

Enter your answer in the box.

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
One-Step Equations	**1.** $m + 12 = 10$ $-12 \quad -12$ $m = -2$	**2.** $-2 = g - 9$ $+9 \quad +9$ $7 = g$
	3. $\frac{-7y}{-7} = \frac{-91}{-7}$ $y = 13$	**4.** $\frac{a}{9} = -4 \cdot 9$ $a = -36$
Fractions To "get rid" of a fraction, multiply by the reciprocal !	**5.** $\frac{3}{2} \cdot \frac{2}{3}x = 10 \cdot \frac{3}{2}$ $x = 15$	**6.** $\frac{9}{4} \cdot \frac{4}{9}w = -8 \cdot \frac{9}{4}$ $w = -18$
	7. $\frac{-5}{6} \cdot -\frac{6}{5}k = 12 \cdot \frac{-5}{6}$ $k = -10$	**8.** $-2 \cdot -\frac{1}{2}m = -9 \cdot -2$ $m = 18$
Two-Step Equations	**To Solve a Two-Step Equation:** 1. Undo the **Addition/Subtraction** (to remove constant term) 2. Undo the **Multiplication/Division** (to remove coefficient)	
	9. $6x + 8 = 50$ $-8 \quad -8$ $\frac{6x}{6} = \frac{42}{6}$ $x = 7$	**10.** $2n - 5 = 11$ $+5 \quad +5$ $\frac{2n}{2} = \frac{16}{2}$ $n = 8$
	11. $13 = -4k + 9$ $-9 \quad -9$ $\frac{4}{-4} = \frac{-4k}{-4}$ $k = -1$	**12.** $7 - 3y = 34$ $-7 \quad -7$ $\frac{-3y}{-3} = \frac{27}{-3}$ $y = -9$

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13. $\frac{x}{2} - 7 = 9$

$+7 \quad +7$

$2 \cdot \frac{x}{2} = 16 \cdot 2$

$\boxed{x = 32}$

14. $11 = \frac{c}{-5} + 8$

$-8 \quad -8$

$-5 \cdot 3 = \frac{c}{-5} \cdot -5$

$\boxed{-15 = c}$

15. $\frac{3}{5}x + 22 = 28$

$-22 \quad -22$

$\frac{5}{3} \cdot \frac{3}{5}x = 6 \cdot \frac{5}{3}$

$\boxed{x = 10}$

16. $-\frac{1}{3}m + 1 = -7$

$-1 \quad -1$

$-3 \cdot -\frac{1}{3}m = -8 \cdot -3$

$\boxed{m = 24}$

17. $-10 \div \frac{7}{4}p = -38$

$+10 \quad +10$

$\frac{4}{7} \cdot \frac{7}{4}p = -28 \cdot \frac{4}{7}$

$\boxed{p = -16}$

18. $15 = 9 - \frac{1}{2}x$

$-9 \quad -9$

$-2 \cdot 6 = -\frac{1}{2}x \cdot -2$

$\boxed{-12 = x}$

Watch Out!

The examples below are different in that the multiplication/division is done FIRST, followed by the addition/subtraction.

19. $8 \cdot \frac{x+11}{8} = -3 \cdot 8$

$x + 11 = -24$

$-11 \quad -11$

$\boxed{x = -35}$

20. $-2 \cdot \frac{n-5}{-2} = -7 \cdot -2$

$n - 5 = 14$

$+5 \quad +5$

$\boxed{n = 19}$

21. $-6 \cdot 1 = \frac{a-13}{-6} \cdot -6$

$-6 = a - 13$

$+13 \quad +13$

$\boxed{7 = a}$

22. $9 \cdot 4 = \frac{w+8}{9} \cdot 9$

$36 = w + 8$

$-8 \quad -8$

$\boxed{28 = w}$

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Steps to Solve a Multi-Step Equation	1. Distribute (if necessary) 2. Combine like terms. 3. Solve!
Examples	

1. $9x + 1 - 7x - 5 = -20$

$2x - 4 = -20$

$+4 \quad +4$

$\frac{2x}{2} = \frac{-16}{2}$

$x = -8$

2. $91 = -7(3a - 1)$

$91 = -21a + 7$

$-7 \quad -7$

$\frac{84}{-21} = \frac{-21a}{-21}$

$a = -4$

3. $4m - 5(3m + 10) = 126$

$4m - 15m - 50 = 126$

$-11m - 50 = 126$

$+50 \quad +50$

$\frac{-11m}{-11} = \frac{176}{-11}$

$m = -16$

4. $-3(k - 8) - (k + 5) = 23$

$-3k + 24 - k - 5 = 23$

$-4k + 19 = 23$

$-19 \quad -19$

$\frac{-4k}{-4} = \frac{4}{-4}$

$k = -1$

5. $20 = 10x - 6(2x + 5)$

$20 = 10x - 12x - 30$

$20 = -2x - 30$

$+30 \quad +30$

$\frac{50}{-2} = \frac{-2x}{-2}$

$x = -25$

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6. $8(2w-1)-4w=-116$

$16w-8-4w=-116$

$12w-8=-116$

$+8 \quad +8$

$\frac{12w}{12}=\frac{-108}{12}$

$w=-9$

7. $11h-(2h-1)=118$

$11h-2h+1=118$

$9h+1=118$

$-1 \quad -1$

$\frac{9h}{9}=\frac{117}{9}$

$h=13$

8. $-25=\frac{1}{2}(10x-2)+3x$

$-25=5x-1+3x$

$-25=8x-1$

$+1 \quad +1$

$\frac{-24}{8}=\frac{8x}{8}$

$x=-3$

9. $7-\frac{5}{2}(8r-6)+2r=32$

$7-20r+15+2r=32$

$-18r+22=32$

$-22 \quad -22$

$\frac{-18r}{-18}=\frac{10}{-18}$

$r=-\frac{5}{9}$

Translate & Solve

10. *"Five times the difference of twice a number and three, decreased by the sum of the number and eight, equals 13."*

$5(2n-3)-(n+8)=13$

$10n-15-n-8=13$

$9n-23=13$

$+23 \quad +23$

$\frac{9n}{9}=\frac{36}{9}$

$n=4$

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Steps to Solve	1. Distribute (if necessary) 2. Combine like terms. 3. Move variables to one side. 4. Solve!

Examples

1. $5y - 8 = 3y + 12$

$-3y \quad -3y$

$2y - 8 = 12$

$+8 \quad +8$

$\frac{2y}{2} = \frac{20}{2}$

$\boxed{y = 10}$

2. $-6x + 14 = 12 - 8x$

$+8x \quad +8x$

$2x + 14 = 12$

$-14 \quad -14$

$\frac{2x}{2} = \frac{-2}{2}$

$\boxed{x = -1}$

3. $7k = 3k - 36$

$-3k \quad -3k$

$\frac{4k}{4} = \frac{-36}{4}$

$\boxed{k = -9}$

4. $12 - 2u = 9u + 45$

$+2u \quad +2u$

$12 = 11u + 45$

$-45 \quad -45$

$\frac{-33}{11} = \frac{11u}{11}$

$\boxed{-3 = u}$

5. $11 - m = 51 - 6m$

$+6m \quad +6m$

$11 + 5m = 51$

$-11 \quad -11$

$\frac{5m}{5} = \frac{40}{5}$

$\boxed{m = 8}$

6. $-10k + 1 = 40 - 7k$

$+10k \quad +10k$

$1 = 40 + 3k$

$-40 \quad -40$

$\frac{-39}{3} = \frac{3k}{3}$

$\boxed{-13 = k}$

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7. $3(6p - 1) = 11p - 45$

$18p - 3 = 11p - 45$

$-11p \quad -11p$

$7p - 3 = -45$

$+3 \quad +3$

$\frac{7p}{7} = \frac{-42}{7}$

$\boxed{p = -6}$

8. $2(4w - 1) = -10(w - 3) + 4$

$8w - 2 = -10w + 30 + 4$

$8w - 2 = -10w + 34$

$+10w \quad +10w$

$18w - 2 = 34$

$+2 \quad +2$

$\frac{18w}{18} = \frac{36}{18}$

$\boxed{w = 2}$

9. $9(m - 3) + 3m = 7m + 43$

$9m - 27 + 3m = 7m + 43$

$12m - 27 = 7m + 43$

$-7m \quad -7m$

$5m - 27 = 43$

$+27 \quad +27$

$\frac{5m}{5} = \frac{70}{5}$

$\boxed{m = 14}$

10. $-16 - 7(2a + 3) = 23 - 2a$

$-16 - 14a - 21 = 23 - 2a$

$-14a - 37 = 23 - 2a$

$+14a \quad +14a$

$-37 = 23 + 12a$

$-23 \quad -23$

$\frac{-60}{12} = \frac{12a}{12}$

$\boxed{-5 = a}$

11. $5x - (x - 18) = 6 - 2(x + 15)$

$5x - x + 18 = 6 - 2x - 30$

$4x + 18 = -2x - 24$

$+2x \quad +2x$

$6x + 18 = -24$

$-18 \quad -18$

$\frac{6x}{6} = \frac{-42}{6}$

$\boxed{x = -7}$

12. $8(y + 4) - 2(y - 1) = 70 - 3y$

$8y + 32 - 2y + 2 = 70 - 3y$

$6y + 34 = 70 - 3y$

$+3y \quad +3y$

$9y + 34 = 70$

$-34 \quad -34$

$\frac{9y}{9} = \frac{36}{9}$

$\boxed{y = 4}$

Summary: _____

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NO SOLUTION & INFINITE SOLUTION

No Solution	Infinite Solution
$-4(2x+1) = -8x - 2$ $-8x - 4 = -8x - 2$ $+8x \quad +8x$ $-4 \neq -2$ $\emptyset$	$-5 - 9x = 3(1 - 3x) - 8$ $-5 - 9x = 3 - 9x - 8$ $-5 - 9x = -5 - 9x$ $+9x \quad +9x$ $-5 = -5$ ∞
There is **no possible number** that could work as a solution to the equation!	**Every number** could work as a solution!

MORE EXAMPLES!

1 $3(2x + 2) - 3x = 6 + 3x$

$6x + 6 - 3x = 6 + 3x$

$3x + 6 = 6 + 3x$

$-3x \quad -3x$

$6 = 6$

∞

2 $6(2x - 6) = -7(-2x + 4)$

$12x - 36 = 14x - 28$

$-12x \quad -12x$

$-36 = 2x - 28$

$+28 \quad +28$

$\frac{-8}{2} = \frac{2x}{2}$

$-4 = x$

3 $8(5x - 3) = 6(-3x - 4)$

$40x - 24 = -18x - 24$

$+18x \quad +18x$

$58x - 24 = -24$

$+24 \quad +24$

$\frac{58x}{58} = \frac{0}{58}$

$x = 0$

4 $3x - 13 = 7(x + 2) - 4(x - 7)$

$3x - 13 = 7x + 14 - 4x + 28$

$3x - 13 = 3x + 42$

$-3x \quad -3x$

$-13 \neq 42$

$\emptyset$

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Week 2-Write Equations/Evaluate Expressions/Order of Operations. (3 problems/D

Write each as an algebraic expression.

1) n increased by 5 is equal to 13

2) half of w is 24

3) the difference of x and 11 is 36

4) the product of b and 8 is equal to 5

5) the product of x and 6 is equal to 17

6) n squared is greater than or equal to 35

7) the sum of x and 12 is greater than 14

8) p decreased by 8 is less than 25

Evaluate each using the values given.

9) $(y)(-1-x)$; use $x=1$, and $y=5$

10) $y-(3-x)$; use $x=1$, and $y=-3$

11) $(n+4)(m-4)$; use $m=-4$, and $n=-5$

12) $xy+x^3$; use $x=2$, and $y=-1$

Evaluate each expression.

13) $6-\left|\frac{9}{-3}\right|$

14) $(|3+2|)(4)$

15) $((4)(3)-5)(4)$

16) $\frac{(-15)+4-1}{6}$

17) $\frac{(1-3)(2)}{-2}$

18) $((-1)-3)^2-1$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
Key Words & Phrases	**ADDITION +** • sum • total • plus • increased by • more than	**SUBTRACTION −** • difference • minus • decreased by • less than * • subtracted from*
	MULTIPLICATION ● • times • product • of • twice • double / triple	**DIVISON /** • quotient • separate • divided by • half / third •
	(Parentheses Phrases) • times "the sum of" • times "the difference of / between"	**"Turn Around" Phrases** • less than • subtracted from
Examples	**Directions:** Translate each expression or equation.	
	1. "the product of a number and 3" $3n$	**2.** "the difference between a number and 10" $n-10$
	3. "the quotient of a number and -5" $\frac{n}{-5}$	**4.** "four subtracted from a number" $n-4$
	5. "the sum of twice a number and 7" $2n+7$	**6.** "the product of a number and 10, increased by 1" $10n+1$

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	7. "four less than a number squared" n^2-4	**8.** "twice a number divided by 5" $\frac{2n}{5}$
Equations	**9.** "the sum of twice a number and 10 is 36" $2n+10=36$	**10.** "three times the difference of a number and 7 is 18" $3(n-7)=18$
	11. "four times a number divided by 8 is 3" $\frac{4n}{8}=3$	**12.** "five times the sum of a number and 6 is 48" $5(n+6)=48$
	13. "one half of a number is 8 less than the number itself" $\frac{1}{2}n = n-8$	**14.** "the product of a number and 3 is the same as the sum of that number and six" $3n = n+6$
	15. "fifteen decreased by the quotient of a number and 3 is 20" $15-\frac{n}{3}=20$	**16.** "four less than the product of a number and 7 is eight more than that number" $7n-4 = 8+n$

Inequalities	**LESS THAN**	**LESS THAN OR EQUAL TO**	**GREATER THAN**	**GREATER THAN OR EQUAL TO**
	$<$	$\leq$	$>$	$\geq$

Examples	**17.** "a number is less than -10" $n<-10$	**18.** "a number is less than or equal to 8" $n\leq 8$
	19. "a number is greater than or equal to -4" $n\geq -4$	**20.** "a number is at most 45" $n\leq 45$
	21. "a speed limit of 55 mph" $n\leq 55$	**22.** "a number is at least 16" $n\geq 16$
	23. "a number is no less than 10" $n\geq 10$	**24.** "a number is no more than 26" $n\leq 26$
	25. "a maximum number of 25" $n\leq 25$	**26.** "a minimum number of 5" $n\geq 5$

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TRANSLATE... AND SOLVE!

1 "Twice a number plus 4 is 8"	$2n+4=8$ $-4\ \ -4$ $\frac{2n}{2}=\frac{4}{2}$ $\boxed{n=2}$	2 "The product of 4 and a number plus 17 is 5."	$4n+17=5$ $-17\ \ -17$ $\frac{4n}{4}=\frac{-12}{4}$ $\boxed{n=-3}$
3 "Twice a number minus 5 is 7"	$2n-5=7$ $+5\ \ +5$ $\frac{2n}{2}=\frac{12}{2}$ $\boxed{n=6}$	4 "The quotient of a number and 6 minus 3 is 1"	$\frac{n}{6}-3=1$ $+3\ \ +3$ $6\cdot\frac{n}{6}=4\cdot 6$ $\boxed{n=24}$
5 "Two more than 4 times a number is -18"	$4n+2=-18$ $-2\ \ -2$ $\frac{4n}{4}=\frac{-20}{4}$ $\boxed{n=-5}$	6 "Seven less than twice a number is 5"	$2n-7=5$ $+7\ \ +7$ $\frac{2n}{2}=\frac{12}{2}$ $\boxed{n=6}$
7 "Five less than the quotient of a number and 3 is -7"	$\frac{n}{3}-5=-7$ $+5\ \ +5$ $3\cdot\frac{n}{3}=-2\cdot 3$ $\boxed{n=-6}$	8 "One subtracted from the product of 4 and a number is 11"	$4n-1=11$ $+1\ \ +1$ $\frac{4n}{4}=\frac{12}{4}$ $\boxed{n=3}$
9 "The quotient of a number and -9, increased by 10 is 11"	$\frac{n}{-9}+10=11$ $-10\ \ -10$ $-9\frac{n}{-9}=1\cdot -9$ $\boxed{n=-9}$	10 "Half of a number decreased by 8 is -3"	$\frac{1}{2}n-8=-3$ $+8\ \ +8$ $2\cdot\frac{1}{2}n=5\cdot 2$ $\boxed{n=10}$

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11 "The sum of three-fourths of a number and 1 is -5"	$\frac{3}{4}n + 1 = -5$ $-1 \quad -1$ $\frac{4}{3}\cdot\frac{3}{4}n = -6 \cdot \frac{4}{3}$ $\boxed{n = -8}$	12 "Ten minus one-third of a number is 4"	$10 - \frac{1}{3}n = 4$ $-10 \quad -10$ $-3 \cdot -\frac{1}{3}n = -6 \cdot -3$ $\boxed{n = 18}$
13 "Four more than the quotient of a number and 3 is at least 9"	$4 + \frac{n}{3} \geq 9$ $-4 \quad -4$ $3 \cdot \frac{n}{3} \geq 5 \cdot 3$ $\boxed{n \geq 15}$	14 "Negative three times a number increased by seven is less than -11"	$-3n + 7 < -11$ $-7 \quad -7$ $\frac{-3n}{-3} < \frac{-18}{-3}$ $\boxed{n > 6}$
15 "Seven more than one-sixth of a number is greater than three"	$7 + \frac{1}{6}n > 3$ $-7 \quad -7$ $6 \cdot \frac{1}{6}n > -4 \cdot 6$ $\boxed{n > -24}$	16 "The sum of 5 and the twice a number is at most 27"	$5 + 2n \leq 27$ $-5 \quad -5$ $\frac{2n}{2} \leq \frac{22}{2}$ $\boxed{n \leq 11}$
17 "Four less than two-fifths of a number is no less than 2"	$\frac{2}{5}n - 4 \geq 2$ $+4 \quad +4$ $\frac{5}{2}\cdot\frac{2}{5}n \geq 6 \cdot \frac{5}{2}$ $\boxed{n \geq 15}$	18 "Three-fourths of a number decreased by 10 is greater than or equal 5"	$\frac{3}{4}n - 10 \geq 5$ $+10 \quad +10$ $\frac{4}{3}\cdot\frac{3}{4}n \geq 15 \cdot \frac{4}{3}$ $\boxed{n \geq 20}$
19 "The quotient of a number and -5, increased by 7 is at minimum 1"	$\frac{n}{-5} + 7 \geq 1$ $-7 \quad -7$ $-5 \cdot \frac{n}{-5} \geq -6 \cdot -5$ $\boxed{n \leq 30}$	20 "One less than half a number is a maximum of 19"	$\frac{1}{2}n - 1 \leq 19$ $+1 \quad +1$ $2\frac{1}{2}n \leq 20 \cdot 2$ $\boxed{n \leq 40}$

GOOD JOB!

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Name:	Date:
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Main Ideas/Questions	Notes/Examples
Literal Equations	Equations with multiple variables.

SOLVE EACH OF THE EQUATIONS BELOW FOR x:

$2x - 5 = 13$
$+5 \quad +5$
$\frac{2x}{2} = \frac{18}{2}$
$\boxed{x = 9}$

$ax - b = c$
$+b \quad +b$
$\frac{ax}{a} = \frac{c+b}{a}$
$\boxed{x = \frac{c+b}{a}}$

Quick Write

Identify the similarities and differences between the two equations:

- Both use opposite operations to isolate
- The literal equation doesn't simplify nicely, due to multiple variables.

One-Step Problems

1. $A = lw$ — solve for w
$\frac{A}{l} = \frac{lw}{l}$
$\boxed{w = \frac{A}{l}}$

2. $A = bh$ — solve for h
$\frac{A}{b} = \frac{bh}{b}$
$\boxed{h = \frac{A}{b}}$

3. $d = rt$ — solve for t
$\frac{d}{r} = \frac{rt}{r}$
$\boxed{t = \frac{d}{r}}$

4. $I = prt$ — solve for t
$\frac{I}{pr} = \frac{prt}{pr}$
$\boxed{t = \frac{I}{pr}}$

5. $V = lwh$ — solve for h
$\frac{V}{lw} = \frac{lwh}{lw}$
$\boxed{h = \frac{V}{lw}}$

6. $A = \pi r^2$ — solve for r
$\frac{A}{\pi} = \frac{\pi r^2}{\pi}$
$\sqrt{\frac{A}{\pi}} = \sqrt{r^2}$
$\boxed{r = \pm\sqrt{\frac{A}{\pi}}}$

7. $m = c - s$ — solve for c
$+s \quad +s$
$\boxed{c = m + s}$

8. $D = \frac{m}{v} \cdot V$ — solve for m
$\boxed{m = Dv}$

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Multi-Step Problems

Helpful Hints:

- Think backwards PEMDAS ←
- Remove fractions by multiplying by the reciprocal.
- Last step is USUALLY to divide by whatever is next to your variable.

9. $A = \frac{1}{2}bh$ solve for h · 2

$\frac{2A}{b} = \frac{bh}{b}$

$\boxed{\frac{2A}{b} = h}$

10. $V = \frac{1}{3}Bh$ solve for B · 3

$\frac{3V}{h} = \frac{Bh}{h}$

$\boxed{B = \frac{3V}{h}}$

11. $K = \frac{mv^2}{2}$ solve for m · 2

$\frac{2K}{v^2} = \frac{mv^2}{v^2}$

$\boxed{\frac{2K}{v^2} = m}$

12. $a = \frac{b+c}{d}$ solve for b · d

$ad = b + c$

$-c \quad -c$

$\boxed{ad - c = b}$

13. $P = 2L + 2W$ solve for W

$-2L \quad -2L$

$\frac{P-2L}{2} = \frac{2W}{2}$

$\boxed{\frac{P-2L}{2} = W}$

14. $Ax + By = C$ solve for y

$-Ax \quad -Ax$

$\frac{By}{B} = \frac{C-Ax}{B}$

$\boxed{y = \frac{C-Ax}{B}}$

15. $y = mx + b$ solve for x

$-b \quad -b$

$\frac{y-b}{m} = \frac{mx}{m}$

$\boxed{\frac{y-b}{m} = x}$

16. $A = P + Prt$ solve for t

$-P \quad -P$

$\frac{A-P}{Pr} = \frac{Prt}{Pr}$

$\boxed{\frac{A-P}{Pr} = t}$

17. $C = \frac{5}{9}(F-32)$ solve for F · $\frac{9}{5}$

$\frac{9}{5}C = F - 32$

$+32 \quad +32$

$\boxed{\frac{9}{5}C + 32 = F}$

18. $A = \frac{1}{2}h(b_1 + b_2)$ solve for b_1 · 2

$\frac{2A}{h} = \frac{h(b_1+b_2)}{h}$

$\frac{2A}{h} = b_1 + b_2$

$-b_2 \quad -b_2$

$\boxed{b_1 = \frac{2A}{h} - b_2}$

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
ALGEBRAIC EXPRESSION	A mathematical phrase made up of numbers and variables.
SUBSTITUTION *Property*	If $a = b$, then a may be replaced for b in any expression
EVALUATING *Expressions*	**To evaluate an expression variable replacements:** • Substitute the variables with their given values. • Each time you substitute a variable with a number, put parenthesis around the number! • Follow the order of operations to evaluate!
EXAMPLES	**Directions:** Evaluate each expression using the variable replacements.

1. $ab^2 + c$ if $a = 2$, $b = 4$, $c = 7$

$(2)(4)^2 + 7$

$2(16) + 7$

$32 + 7 = \boxed{39}$

2. $3x^2 - 4x$ if $x = -2$

$3(-2)^2 - 4(-2)$

$3(4) + 8$

$12 + 8 = \boxed{20}$

YOU TRY!	**Directions:** Evaluate each expression using the variable replacements.

3. $a^2b - b^2$ if $a = 3$ and $b = -4$

$(3)^2(-4) - (-4)^2$

$9(-4) - (16)$

$-36 - 16 = \boxed{-52}$

4. $a^2b - b^2$ if $a = 4$ and $b = -7$

$(4)^2(-7) - (-7)^2$

$16(-7) - 49$

$-112 - 49 = \boxed{-161}$

5. $-y^2 - 3xy$ if $x = -4$ and $y = 2$

$-(2)^2 - 3(-4)(2)$

$-4 + 12(2)$

$-4 + 24 = \boxed{20}$

6. $-y^2 - 3xy$ if $x = -\frac{5}{6}$ and $y = -12$

$-(-12)^2 - 3(-5/6)(-12)$

$-144 + (5/2)(-12)$

$-144 - 30 = \boxed{-174}$

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7. $\frac{a^2+b^2}{a-b}$ if $a = 3$ and $b = 4$

$\frac{(3)^2+(4)^2}{3-4}$

$\frac{9+16}{-1} = \frac{25}{-1} = \boxed{-25}$

8. $\frac{a^2+b^2}{a-b}$ if $a = -3$ and $b = -5$

$\frac{(-3)^2+(-5)^2}{(-3)-(-5)}$

$\frac{9+25}{-3+5} = \frac{34}{2} = \boxed{17}$

9. $x^2-2(x-y)-z^3$ if $x = 2$, $y = -2$, and $z = -3$

$(2)^2-2(2-(-2))-(-3)^3$

$4-2(4)-(-27)$

$4-8+27$

$-4+27 = \boxed{23}$

10. $x^2-2(x-y)-z^3$ if $x = -3$, $y = 4$ and $z = -1$

$(-3)^2-2(-3-4)-(-1)^3$

$9-2(-7)-(-1)$

$9+14+1$

$23+1 = \boxed{24}$

11. $-a^2-2bc-|c|$ if $a = -2$, $b = 3$, and $c = -3$

$-(-2)^2-2(3)(-3)-|-3|$

$-4-6(-3)-3$

$-4+18-3$

$14-3 = \boxed{11}$

12. $-a^2-2bc-|c|$ if $a = -3$, $b = -5$, and $c = 2$

$-(-3)^2-2(-5)(2)-|2|$

$-9+10(2)-2$

$-9+20-2$

$11-2 = \boxed{9}$

Summary: _____

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Absolute Value	The distance from zero on a number line

Examples

Directions: Evaluate each expression.

1. $\lvert -13 \rvert =$ 13	**2.** $\lvert 21 \rvert =$ 21	**3.** $\lvert -3 \rvert + \lvert -5 \rvert =$ $3+5=8$
4. $\lvert 9 \rvert + \lvert -8 \rvert =$ $9+8=17$	**5.** $\lvert -12 \rvert + \lvert 15 \rvert =$ $12+15=27$	**6.** $\lvert 21-17 \rvert =$ $\lvert 4 \rvert = 4$
7. $\lvert -11 \rvert - \lvert -5 \rvert =$ $11-5=6$	**8.** $\lvert 4 \rvert - \lvert -4 \rvert =$ $4-4=0$	**9.** $\lvert 15-23 \rvert =$ $\lvert -8 \rvert = 8$
10. $\lvert 24 \rvert - \lvert -15 \rvert =$ $24-15=9$	**11.** $\lvert 28 \rvert - \lvert -26 \rvert =$ $28-26=2$	**12.** $\lvert -3 \rvert - \lvert 19 \rvert =$ $3-19=-16$

Order of Operations

Simplifying an expression using a specific order

P	Parenthesis + Grouping Symbols
E	Exponents
M/D	Multiplication/Division from left → right
A/S	Addition/Subtraction from left → right

Examples

Directions: Evaluate each expression.

13. $7+54\div3(2)$

$=7+18(2)$

$=7+36$

$=43$

14. $17-2^5\div4+6$

$=17-32\div4+6$

$=17-8+6$

$=9+6$

$=15$

15. $24-4^2\cdot3+15$

$=24-16\cdot3+15$

$=24-48+15$

$=-24+15$

$=-9$

16. $\dfrac{(7-2^2)+17}{-14+2\cdot5}$

$=\dfrac{(7-4)+17}{-14+10}$

$=\dfrac{20}{-4}=-5$

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17. $(8-5)^3-|5^2-4^3|\div 3$

$= (3)^3 - |25-64| \div 3$

$= 27 - |-39| \div 3$

$= 27 - 13$

$= \boxed{14}$

18. $|-7^2+3^2\cdot 4|+18\div 2\cdot 5$

$= |-49+9\cdot 4| + 9\cdot 5$

$= |-49+36| + 45$

$= |-13| + 45$

$= 13+45 = \boxed{58}$

19. $\dfrac{5^2-3^4}{(2^3-5)\cdot(6^2\div 9)}$

$= \dfrac{25-81}{(8-5)\cdot(36\div 9)}$

$= \dfrac{-56}{3\cdot 4} = \dfrac{-56}{12} = \boxed{\dfrac{-14}{3}}$

20. $-|-9-10|+12^2\div 6\cdot 3$

$= -|-19| + 144 \div 6\cdot 3$

$= -19 + 24\cdot 3$

$= -19 + 72$

$= \boxed{53}$

21. $20^2\div\{3(5-9)^2+2\}$

$= 400 \div \{3(-4)^2+2\}$

$= 400 \div \{3(16)+2\}$

$= 400 \div \{48+2\}$

$= 400 \div 50$

$= \boxed{8}$

22. $\dfrac{12[30-(9+4^2)]}{|10|-|-6|}$

$= \dfrac{12[30-(9+16)]}{10-6}$

$= \dfrac{12[30-25]}{4}$

$= \dfrac{12(5)}{4} = \dfrac{60}{4} = \boxed{15}$

23. $\dfrac{84}{12}+(5-7^2)-72\div 6\cdot 2$

$= 7+(5-49)-12\cdot 2$

$= 7+(-44)-24$

$= -37-24$

$= \boxed{-61}$

24. $\dfrac{-(8-11)^3-3|-14|}{2^4-7}$

$= \dfrac{-(-3)^3-3(14)}{16-7}$

$= \dfrac{-(-27)-42}{9}$

$= \dfrac{27-42}{9} = \dfrac{-15}{9} = \boxed{\dfrac{-5}{3}}$

Summary: _____

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

Steps to Solve

1. Make sure the absolute value expression is isolated.
2. Set the "inside" equal to both the positive and negative number from the other side of the equation.
3. solve both equations.
4. Write your answer as a solution set. $x = \{\_\_, \_\_\}$

Examples

Directions: Solve each equation. Write your answer as a solution set.

1. $|x| = 2$

$x = 2 \quad x = -2$

$x = \{-2, 2\}$

2. $|m| = 14$

$m = 14 \quad m = -14$

$m = \{-14, 14\}$

3. $|5z| = 40$

$\frac{5z}{5} = \frac{40}{5} \quad \frac{5z}{5} = \frac{-40}{5}$

$z = 8 \quad z = -8$

$z = \{-8, 8\}$

4. $|-7a| = 28$

$\frac{-7a}{-7} = \frac{28}{-7} \quad \frac{-7a}{-7} = \frac{-28}{-7}$

$a = -4 \quad a = 4$

$a = \{-4, 4\}$

5. $|d + 1| = 8$

$d + 1 = 8 \quad d + 1 = -8$

$-1 \quad -1 \quad -1 \quad -1$

$d = 7 \quad d = -9$

$d = \{-9, 7\}$

6. $|w - 3| = 4$

$w - 3 = 4 \quad w - 3 = -4$

$+3 \quad +3 \quad +3 \quad +3$

$w = 7 \quad w = -1$

$w = \{-1, 7\}$

7. $|4n + 2| = 34$

$4n + 2 = 34 \quad 4n + 2 = -34$

$-2 \quad -2 \quad -2 \quad -2$

$\frac{4n}{4} = \frac{32}{4} \quad \frac{4n}{4} = \frac{-36}{4}$

$n = 8 \quad n = -9$

$n = \{-9, 8\}$

8. $|-2v - 5| = 17$

$-2v - 5 = 17 \quad -2v - 5 = -17$

$+6 \quad +5 \quad +5 \quad +5$

$\frac{-2v}{-2} = \frac{22}{-2} \quad \frac{-2v}{-2} = \frac{-12}{-2}$

$v = -11 \quad v = 6$

$v = \{-11, 6\}$

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What if there is "stuff" outside the Absolute Value Bars?

Isolate the abs. value!

9. $|c| + 2 = 12$

$-2 \quad -2$

$|c| = 10$

$c = 10 \qquad c = -10$

$\boxed{c = \{-10, 10\}}$

10. $|y| - 8 = -5$

$+8 \quad +8$

$|y| = 3$

$y = 3 \qquad y = -3$

$\boxed{y = \{-3, 3\}}$

11. $\frac{6|x|}{6} = \frac{24}{6}$

$|x| = 4$

$x = 4 \qquad x = -4$

$\boxed{X = \{-4, 4\}}$

12. $\frac{-2|z+3|}{-2} = \frac{-14}{-2}$

$|z+3| = 7$

$z+3 = 7 \qquad z+3 = -7$

$-3 \quad -3 \qquad -3 \quad -3$

$z = 4 \qquad z = -10$

$\boxed{z = \{-10, 4\}}$

13. $6\frac{|2w-4|}{6} = 3 \cdot 6$

$|2w-4| = 18$

$2w-4 = 18 \qquad 2w-4 = -18$

$+4 \quad +4 \qquad +4 \quad +4$

$\frac{2w}{2} = \frac{22}{2} \qquad \frac{2w}{2} = \frac{-14}{2}$

$w = 11 \qquad w = -7$

$\boxed{w = \{-7, 11\}}$

14. $-10|h+5| - 3 = -83$

$+3 \quad +3$

$\frac{-10|h+5|}{-10} = \frac{-80}{-10}$

$|h+5| = 8$

$h+5 = 8 \qquad h+5 = -8$

$-5 \quad -5 \qquad -6 \quad -5$

$h = 3 \qquad h = -13$

$\boxed{h = \{-13, 3\}}$

15. $7|4n+8| - 6 = 106$

$+6 \quad +6$

$\frac{7|4n+8|}{7} = \frac{112}{7}$

$|4n+8| = 16$

$4n+8 = 16 \qquad 4n+8 = -16$

$4n = 8 \qquad 4n = -24$

$n = 2 \qquad n = -6$

$\boxed{n = \{-6, 2\}}$

16. $\frac{3}{2}|4r-4| - 24 = -21$

$+24 \quad +24$

$\frac{2}{3} \cdot \frac{3}{2}|4r-4| = 3 \cdot \frac{2}{3}$

$|4r-4| = 2$

$4r-4 = 2 \qquad 4r-4 = -2$

$4r = 6 \qquad 4r = 2$

$r = 3/2 \qquad r = 1/2$

$\boxed{r = \{1/2, 3/2\}}$

Special Cases

Directions: Solve the equations below. Explain their solutions.

17. $|x| = -6$

$\emptyset$

18. $\frac{-3|2x+1|}{-3} = \frac{21}{-3}$

$|2x+1| = -7$

Explain:

The absolute value cannot equal a negative number once isolated.

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Incoming Algebra 1 Summer Math Name_____ ID: 1

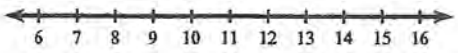
Week 3-Solve/Graph Multistep Inequalities

Date_____ Period____

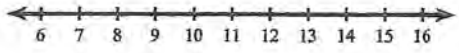
Solve each inequality and graph its solution. 3 problems / day

1) $\frac{-7+r}{9} > -1$

2) $-n - 4 < -14$

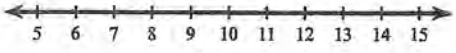


3) $\frac{k+5}{15} \leq 1$



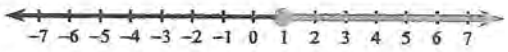
4) $8 + 10r > 38$

5) $10x - 3 > 107$

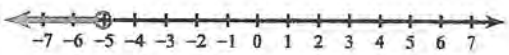


Write an inequality for each graph.

6)



7)



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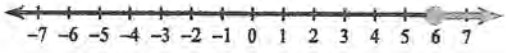
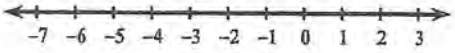


9)

Solve each inequality and graph its solution.

10) $5n + 3(n + 7) \geq 85$

11) $-102 \geq 6(3x - 5)$



12) $-196 \leq -4(1 - 6x)$

Week 3 (cont.)

Solve each equation.

13) $-28 - 8b = -7(-6b + 4)$

14) $-2(1 + 3v) = 14 - 8v$

15) $-34 - 2p = 8 + 3(p - 4)$

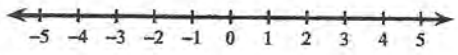
16) $6(-7x + 3) = -5(2 + 7x)$

17) $-x + 5x = -8(1 + 7x) + 8(8x + 1)$

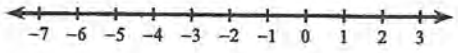
Solve each inequality and graph its solution.

18) $-6k + 32 > -5k - 4(k - 2)$

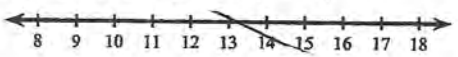
19) $3 - 8p > -5(7p - 6)$



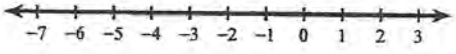
20) $-36 + 6r > -8 + 8(4r + 3)$



21) $3(-7 + 2n) > -5(1 - n)$



22) $4 - (x + 7) \leq 5 - 4(x + 5)$



Name:	Date:
Topic:	Class:

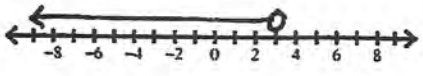
Main Ideas/Questions	Notes/Examples

Rules for GRAPHING INEQUALITIES

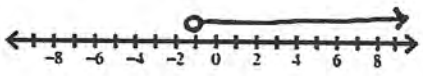
- ✓ Use an open circle for $<$ or $>$ signs.
- ✓ Use a closed circle for $\leq$ or $\geq$ signs.

Graph the following inequalities on the number line.

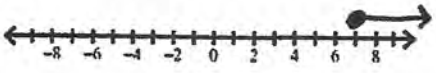
1. $x < 3$



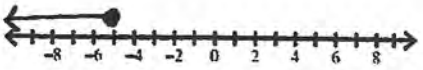
2. $x > -1$



3. $x \geq 7$

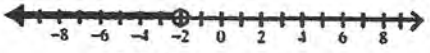


4. $x \leq -5$



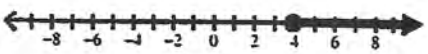
Write an equality given the graph.

5.



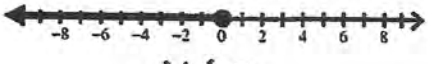
$X < -2$

6.



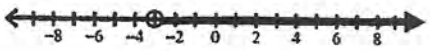
$X \geq 4$

7.



$X \leq 0$

8.



$X > -3$

Rules for SOLVING INEQUALITIES

You must flip **the inequality symbol when you** multiply **or** divide **by a** negative number **!**

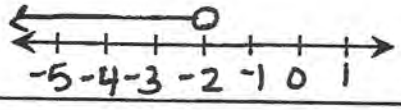
Solve and graph the following inequalities.

9. $3x + 2 < -4$

$-2 \quad -2$

$\frac{3x}{3} < \frac{-6}{3}$

$x < -2$

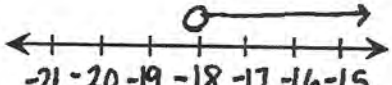


10. $\frac{x}{6} + 2 > -1$

$-2 \quad -2$

$6 \cdot \frac{x}{6} > -3 \cdot 6$

$x > -18$



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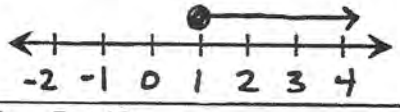
11. $-7x + 8 \le 1$

$-8 \quad -8$

$\frac{-7x}{-7} \le \frac{-7}{-7}$

$x \ge 1$

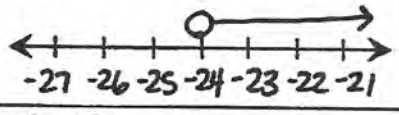


12. $\frac{x}{-8} - 5 < -2$

$+5 \quad +5$

$-8 \cdot \frac{x}{-8} < 3 \cdot -8$

$x > -24$

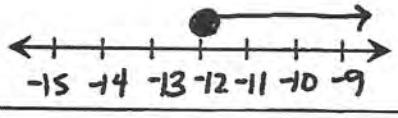


13. $-2x - 5 \le 19$

$+5 \quad +5$

$\frac{-2x}{-2} \le \frac{24}{-2}$

$x \ge -12$

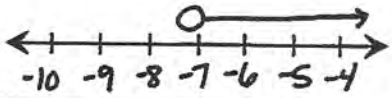


14. $3 - 4x < 31$

$-3 \quad -3$

$\frac{-4x}{-4} < \frac{28}{-4}$

$x > -7$

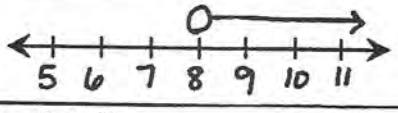


15. $\frac{3}{4}x + 5 > 11$

$-5 \quad -5$

$\frac{4}{3} \cdot \frac{3}{4}x > 6 \cdot \frac{4}{3}$

$x > 8$

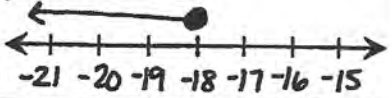


16. $-\frac{5}{6}x - 1 \ge 14$

$+1 \quad +1$

$-\frac{6}{5} \cdot -\frac{5}{6}x \ge 15 \cdot -\frac{6}{5}$

$x \le -18$

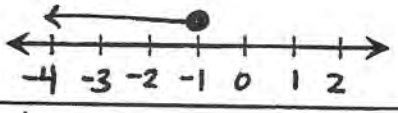


17. $5x - 2 \le -7$

$+2 \quad +2$

$\frac{5x}{5} \le \frac{-5}{5}$

$x \le -1$

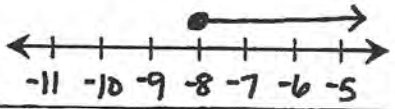


18. $6 - x \le 14$

$-6 \quad -6$

$\frac{-x}{-1} \le \frac{8}{-1}$

$x \ge -8$

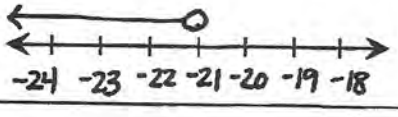


19. $4 - \frac{1}{3}x > 11$

$-4 \quad -4$

$-3 \cdot -\frac{1}{3}x > 7 \cdot -3$

$x < -21$

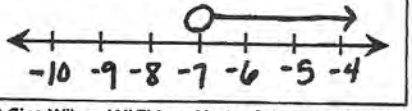


20. $\frac{x + 11}{-2} < -2 \cdot -2$

$x + 11 > 4$

$-11 \quad -11$

$x > -7$



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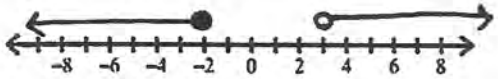
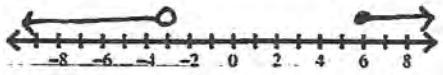
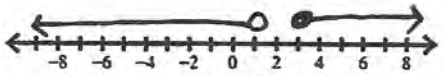
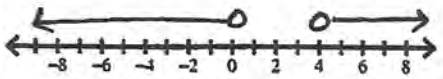
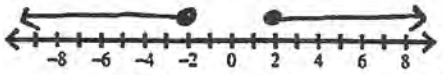
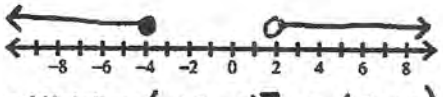
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
COMPOUND INEQUALITIES	Two inequalities (or more) joined together with "and" or "or."
TYPE I: "OR"	**"or" inequalities** have a tendency to **graph** apart
	Example $x \le -2$ OR $x > 3$  **Interval Notation:** $(-\infty, -2]$ or $(3, \infty)$
SOLVING "OR" INEQUALITIES	**Directions:** Solve, graph, then write the solution in interval notation.
	1. $x - 4 < -7$ or $2x \ge 12$ $x < -3$ $x \ge 6$ $x < -3$ or $x \ge 6$  **Interval Notation:** $(-\infty, -3)$ or $[6, \infty)$
	2. $-3x \le -9$ or $5 + x < 6$ $x \ge 3$ $x < 1$ $x < 1$ or $x \ge 3$  **Interval Notation:** $(-\infty, 1)$ or $[3, \infty)$
	3. $2x + 9 > 17$ or $5x + 10 < 10$ $2x > 8$ $5x < 0$ $x > 4$ $x < 0$ $x < 0$ or $x > 4$  **Interval Notation:** $(-\infty, 0)$ or $(4, \infty)$
	4. $7x - 14 \ge 0$ or $4x + 5 \le -3$ $7x \ge 14$ $4x \le -8$ $x \ge 2$ $x \le -2$ $x \le -2$ or $x \ge 2$  **Interval Notation:** $(-\infty, -2]$ or $[2, \infty)$
	5. $-3(2x + 1) < -15$ or $1 - x \ge 5$ $-6x - 3 < -15$ $-x \ge 4$ $-6x < -12$ $x \le -4$ $x > 2$ $x \le -4$ or $x > 2$  **Interval Notation:** $(-\infty, -4]$ or $(2, \infty)$

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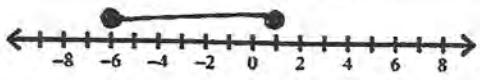
TYPE 2: "AND"

"and" inequalities have a tendency to **graph** together

Example

$x \geq -6$ AND $x \leq 1$



Interval Notation: [-6, 1]

REWRITING "AND" INEQUALITIES

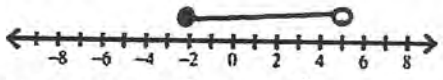
Because the solutions to an "and" inequality fall between two endpoints, they are frequently written in a more condensed form.

Example: $x \geq -6$ and $x \leq 1$ ⇒ $-6 \leq x \leq 1$

SOLVING "AND" INEQUALITIES

6. $2 \leq x + 4 < 9$

$-2 \leq x < 5$

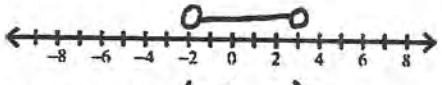


Interval Notation: [-2, 5)

7. $-27 < 7x - 13 < 8$

$-14 < 7x < 21$

$-2 < x < 3$

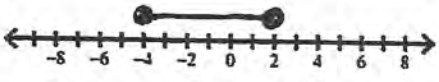


Interval Notation: (-2, 3)

8. $-16 \leq 3x - 4 \leq 2$

$-12 \leq 3x \leq 6$

$-4 \leq x \leq 2$

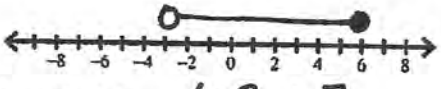


Interval Notation: [-4, 2]

9. $-1 < \frac{2}{3}x + 1 \leq 5$

$-2 < \frac{2}{3}x \leq 4$

$-3 < x \leq 6$



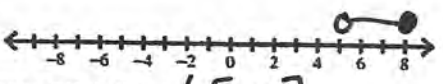
Interval Notation: (-3, 6]

10. $-2 < 2(x - 6) \leq 4$

$-2 < 2x - 12 \leq 4$

$10 < 2x \leq 16$

$5 < x \leq 8$



Interval Notation: (5, 8]

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Incoming Algebra 1 Summer Math Name_____ ID: 1

Week 4-Combine Like Terms/Slope Review

Date_____ Period____

Simplify each expression. 4 problems/day

1) $6m + 3 + 7m - 1$

2) $5k - 5k$

3) $3k - 6 - 8 + 4k$

4) $4 + 9(8 + 7p)$

5) $9 - 3(-8a + 10)$

6) $-9(1 - 7x) - 6$

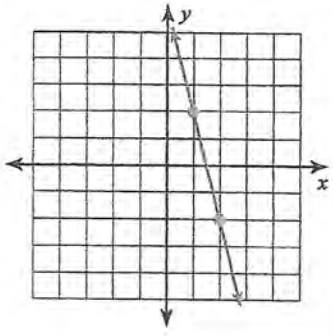
7) $-9(1 - 9b) + 6b$

8) $3(3 + x) - x$

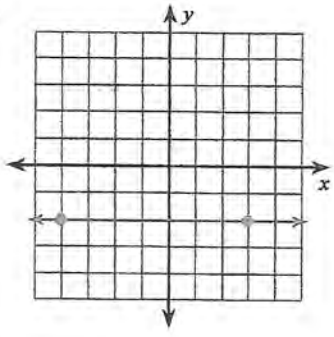
9) $9(1 - 5x) - 9(9 - 9x)$

Find the slope of each line.

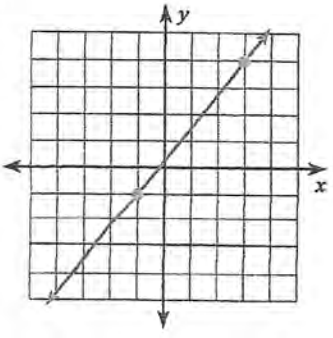
10)



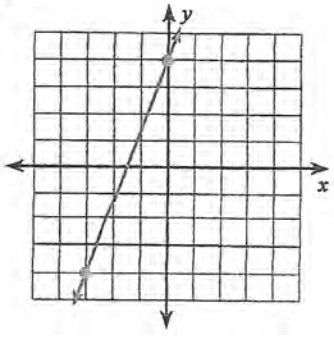
11)



12)

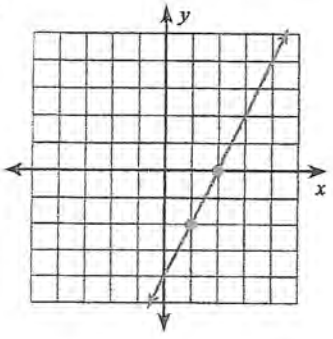


13)



Week 4 (cont)

14)



Find the slope of the line through each pair of points.

15) $(3, -15), (16, -14)$

16) $(18, 20), (-3, 5)$

17) $(-18, 18), (-11, 1)$

18) $(10, -2), (8, 17)$

19) $(2, 8), (-8, -11)$

Find the slope of each line.

20) $y = \frac{8}{3}x - 3$

21) $y = 2x + 4$

22) $y = -\frac{4}{5}x - 3$

23) $y = -x - 5$

24) $y = \frac{2}{5}x - 3$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Parts of an Expression	$7x + 3 - 5x + 8 + 4x - 1$ **Variable Terms** (Terms WITH a variable): $7x, -5x, 4x$ **Constant Terms** (Terms WITHOUT a variable): $3, 8, -1$ **Coefficients** (Number NEXT TO a variable): $7, -5, 4$
Combining Like Terms	You can simplify an algebraic expression by **combining like terms.** This means to combine common variable terms and contant terms. **Example:** Simplify the expression below: $7x + 3 - 5x + 8 + 4x - 1 = 6x + 10$
Examples	**Directions:** Simplify each expression.

1. $3x + 6x$ $9x$	**2.** $9a - 10a$ $-a$
3. $7m - 5m - 6$ $2m - 6$	**4.** $9 - 6w + 5$ $-6w + 14$
5. $7p - 1 - 9p + 5$ $-2p + 4$	**6.** $5h - 6 - 8 + 7h$ $12h - 14$
7. $5x + 7y - x + 2y + 3x$ $7x + 9y$	**8.** $26a + 2b - 4a + 10b$ $22a + 12b$

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with Exponents

Terms with the same exponents or combination of variables and exponents are considered like terms. When combined, be sure to NOT change their exponents!

Examples

9. $5x^2 + 7x^2$

$12x^2$

10. $-15n^5 + 4n^5$

$-11n^5$

11. $8c^3 - 7c^3 + 16c^3$

$17c^3$

12. $8k^2 - k - 5k + 7 - 2k^2$

$6k^2 - 6k + 7$

13. $-4a^2b + 7 + 10a^2b$

$6a^2b + 7$

14. $x^2 + 2xy - 7xy + 4y^2$

$x^2 - 5xy + 4y^2$

15. $a^2 + 7ab - 10ab + b^2$

$a^2 - 3ab + b^2$

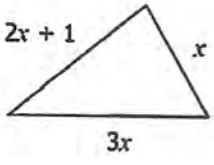
16. $4x^2 - 7 + 2x - 3x^2 + 8x - 6$

$x^2 + 10x - 13$

Geometric Applications

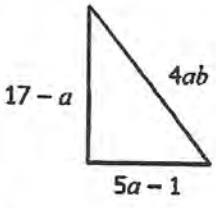
Directions: Give the perimeter of each figure as a simplified expression.

17.



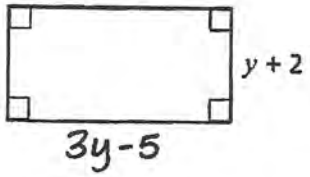
$6x + 1$

18.



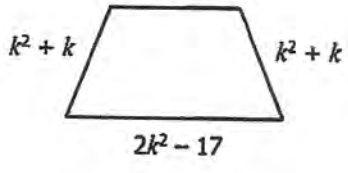
$4a + 4ab + 16$

19.



$8y - 6$

20.



$5k^2 - 7k + 6$

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples		
Distributive Property Recall: $a(b+c) =$ $ab+ac$ or $a(b-c) =$ $ab-ac$	**1.** $7(x+4)$ $7x+28$	**2.** $2(b-3)$ $2b-6$	**3.** $-4(y+3)$ $-4y-12$
	4. $-5(m-2)$ $-5m+10$	**5.** $-(y-9)$ $-y+9$	**6.** $8(4-b)$ $32-8b$
	7. $-4(-w-10)$ $4w+40$	**8.** $5(2m-3)$ $10m-15$	**9.** $-3(2x-4)$ $-6x+12$
	10. $3(m+n)$ $3m+3n$	**11.** $x(y+4)$ $xy+4x$	**12.** $d(c-4)$ $dc-4d$
	13. $6a(b+2c)$ $6ab+12ac$	**14.** $2(x-y+8)$ $2x-2y+16$	**15.** $x(2y-5z+1)$ $2xy-5xz+x$
	16. $\frac{1}{4}(8x-4)$ $2x-1$	**17.** $\frac{1}{6}\left(\frac{3}{5}x+18\right)$ $\frac{1}{10}x+3$	**18.** $-\frac{1}{8}\left(\frac{4}{5}x-24\right)$ $-\frac{1}{10}x+3$
Distribute AND Combine!	To **simplify an expression** means to ensure there are **no parentheses** and **no like terms.** In order to do this, distribute first (if needed), then combine like terms.		
Examples	**19.** $8(2x-3)-6x$ $16x-24-6x$ $=\boxed{10x-24}$	**20.** $9(2k-4)-2(7k-12)$ $18k-36-14k+24$ $=\boxed{4k-12}$	
	21. $10-(y-6)-y$ $10-y+6-y$ $=\boxed{-2y+16}$	**22.** $6+8(4w-7)-(2w+1)$ $6+32w-56-2w-1$ $=\boxed{30w-51}$	
	23. $\frac{9}{4}\left(\frac{10}{3}x-4\right)-\frac{1}{4}(2x-8)$ $\frac{15}{2}x-9-\frac{1}{2}x+2$ $=\boxed{7x-7}$	**24.** $\frac{7}{8}\left(\frac{4}{5}x+16\right)+\frac{3}{5}\left(\frac{1}{2}x-10\right)$ $\frac{7}{10}x+14+\frac{3}{10}x-6$ $=\boxed{x+8}$	

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Rate of Change	A ratio that shows how one variable changes with respect to another. On a linear graph, this is called the slope of the line!
Slope 	• Slope is written as a ratio of the **vertical change** (rise) to the **horizontal change** (run) between any two points on a line. • This remains constant for any two points on the same line. • Slope is written as a fraction in simplest (reduced) form. • Variable for slope: m

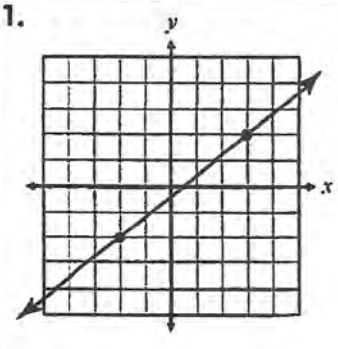
Types of Slope

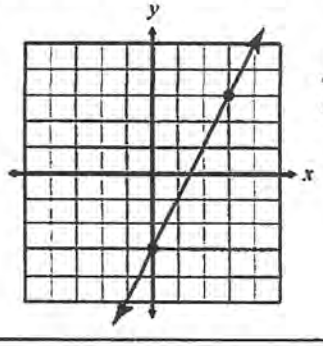
			
Positive	Negative	Zero	Undefined

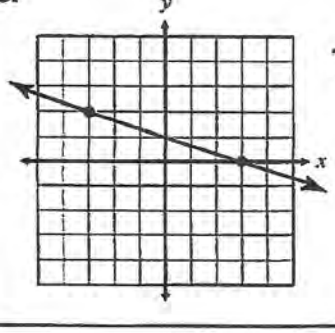
Finding Slope on a Graph

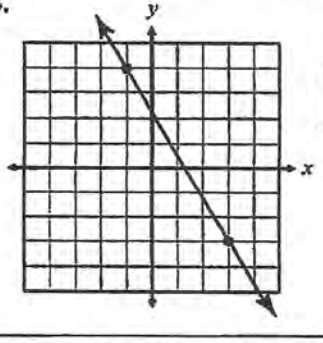
$$m = \frac{\text{rise}}{\text{run}}$$

Directions: Find the slope of each line. Write your answer in simplest form!

1.  $\frac{4}{5}$

2.  $\frac{6}{3} = 2$

3.  $\frac{-2}{6} = \frac{-1}{3}$

4.  $\frac{-7}{4}$

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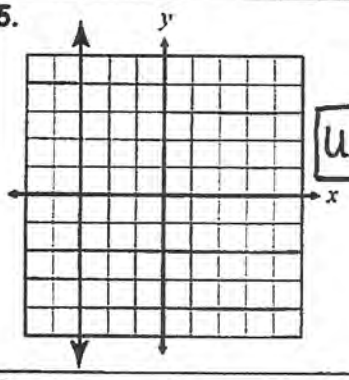
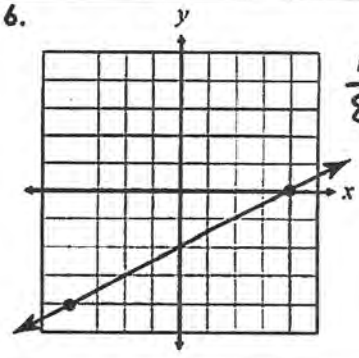
5.



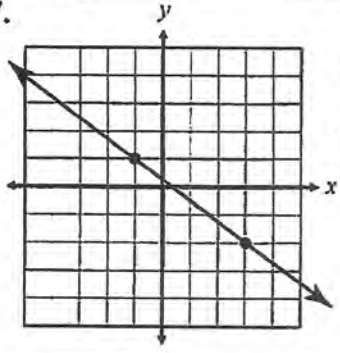
undef

6.



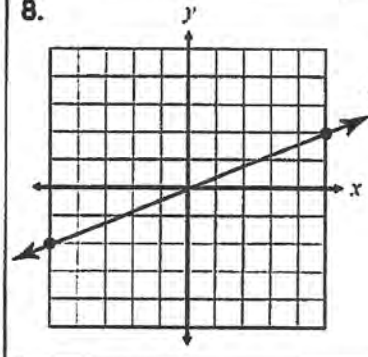
$\frac{4}{8} = \boxed{\frac{1}{2}}$

7.



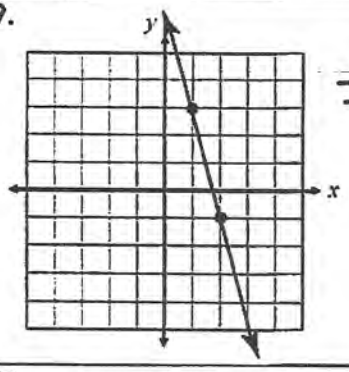
$\boxed{\frac{-3}{4}}$

8.



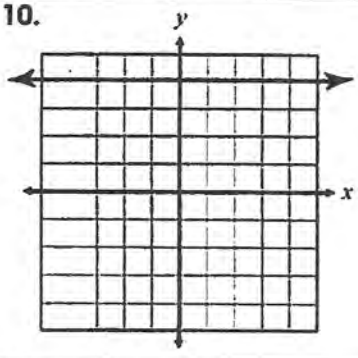
$\frac{4}{10} = \boxed{\frac{2}{5}}$

9.



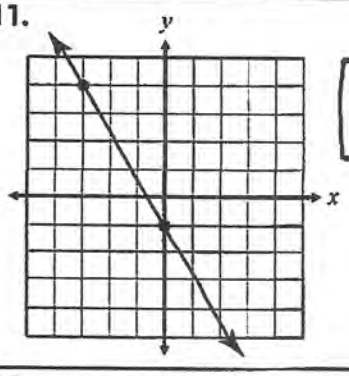
$\frac{-4}{1} = \boxed{-4}$

10.



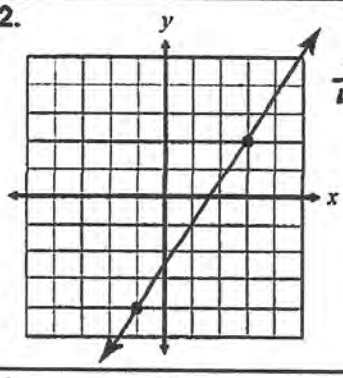
$\boxed{0}$

11.



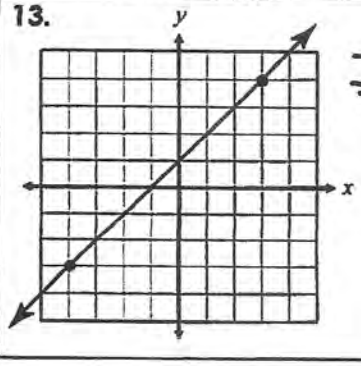
$\boxed{\frac{-5}{3}}$

12.



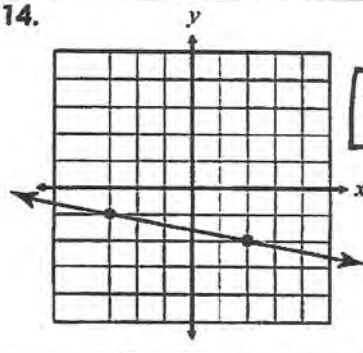
$\frac{6}{4} = \boxed{\frac{3}{2}}$

13.



$\frac{7}{7} = \boxed{1}$

14.



$\boxed{\frac{-1}{5}}$

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Slope Formula	Used to find the slope between any two points (x_1, y_1) and (x_2, y_2)
	Formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$
	Always remember to simplify your answer!
Examples	**Directions:** Find the slope of the line between each pair of points.

1. (-13, 8) and (3, 12)

$m = \frac{12-8}{3-(-13)} = \frac{4}{16} = \boxed{\frac{1}{4}}$

2. (19, -12) and (5, 16)

$m = \frac{16-(-12)}{5-19} = \frac{28}{-14} = \boxed{-2}$

3. (-15, 9) and (-10, 3)

$m = \frac{3-9}{-10-(-15)} = \boxed{\frac{-6}{5}}$

4. (-1, 8) and (8, -4)

$m = \frac{-4-8}{8-(-1)} = \frac{-12}{9} = \boxed{\frac{-4}{3}}$

5. (7, 3) and (6, -2)

$m = \frac{-2-3}{6-7} = \frac{-5}{-1} = \boxed{5}$

6. (12, 7) and (5, 9)

$m = \frac{9-7}{5-12} = \boxed{\frac{2}{-7}}$

7. (-7, -4) and (2, -7)

$m = \frac{-7-(-4)}{2-(-7)} = \frac{-3}{9} = \boxed{\frac{-1}{3}}$

8. (-4, 4) and (-9, 6)

$m = \frac{6-4}{-9-(-4)} = \boxed{\frac{2}{-5}}$

9. (4, -13) and (8, -8)

$m = \frac{-8-(-13)}{8-4} = \boxed{\frac{5}{4}}$

10. (-7, -5) and (5, -17)

$m = \frac{-17-(-5)}{5-(-7)} = \frac{-12}{12} = \boxed{-1}$

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Special Cases

11. (-5, -4) and (1, -4)

$m = \frac{-4-(-4)}{1-(-5)} = \frac{0}{6}$

$= \boxed{0}$

12. (7, 3) and (7, -2)

$m = \frac{-2-3}{7-7} = \frac{-5}{0}$

$= \boxed{\text{undef}}$

****Remember, a zero UNDERNEATH means** undefined **!**

More Practice

13. (-9, -2) and (-9, 8)

$m = \frac{8-(-2)}{-9-(-9)} = \frac{10}{0}$

$= \boxed{\text{undef.}}$

14. (-4, 1) and (11, 1)

$m = \frac{1-1}{11-(-4)} = \frac{0}{15}$

$= \boxed{0}$

15. (15, -2) and (9, -2)

$m = \frac{-2-(-2)}{9-15} = \frac{0}{-6}$

$= \boxed{0}$

16. (12, 7) and (12, -2)

$m = \frac{-2-7}{12-12} = \frac{-9}{0}$

$= \boxed{\text{undef.}}$

Given a Table

Directions: Find the slope of the line that passes through the points give in the table.

17.

x	y
-6	11
-2	1
2	-9
4	-14

(-6, 11) (-2, 1)

$m = \frac{1-11}{-2-(-6)} = \frac{-10}{4}$

$= \boxed{-\frac{5}{2}}$

18.

x	y
-4	-5
-3	-2
-2	1
-1	4

(-4, -5) (-3, -2)

$m = \frac{-2-(-5)}{-3-(-4)}$

$= \frac{3}{1} = \boxed{3}$

19.

x	y
-1	6
3	6
5	6
8	6

$m = \frac{6-6}{3-(-1)}$

$= \frac{0}{4} = \boxed{0}$

20.

x	y
1	8
2	7
4	5
6	3

$m = \frac{7-8}{2-1}$

$= \frac{-1}{1} = \boxed{-1}$

21.

x	y
-3	-8
0	-1
3	6
6	13

$m = \frac{-1-(-8)}{0-(-3)}$

$= \boxed{\frac{7}{3}}$

22.

x	y
-2	5
-2	3
-2	-1
-2	-7

$m = \frac{3-5}{-2-(-2)}$

$= \frac{-2}{0}$

$= \boxed{\text{undef.}}$

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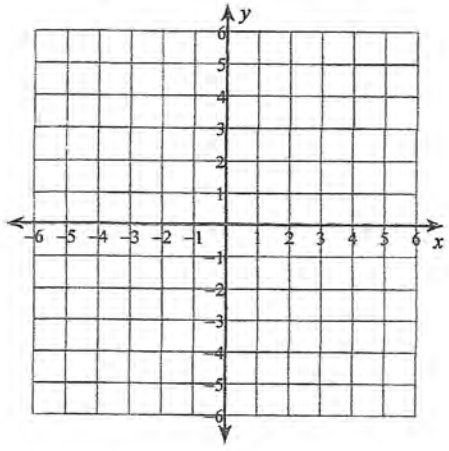
Incoming Alg 1 Summer Math Name_____ ID: 1

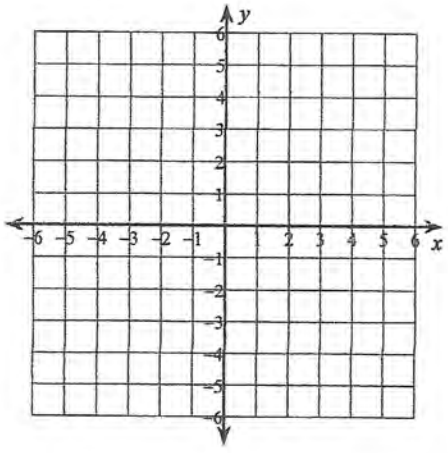
Week 5-Slope Practice 3 problems/day Date_____ Period____

Sketch the graph of each line.

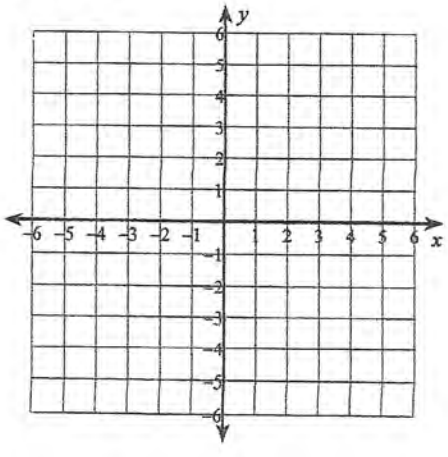
1) $y = \frac{5}{3}x$



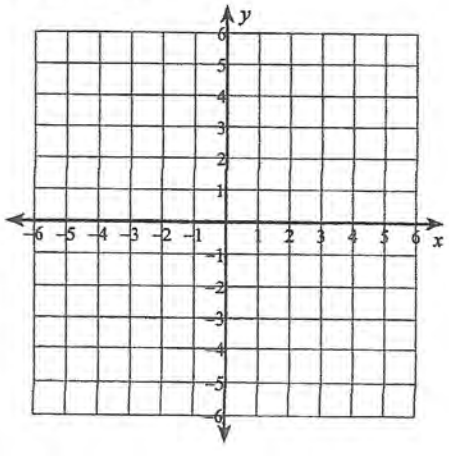
2) $y = \frac{3}{4}x - 5$



3) $x = 1$

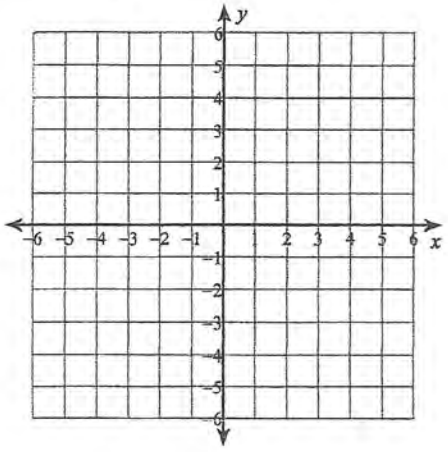


4) $y = -4x - 3$

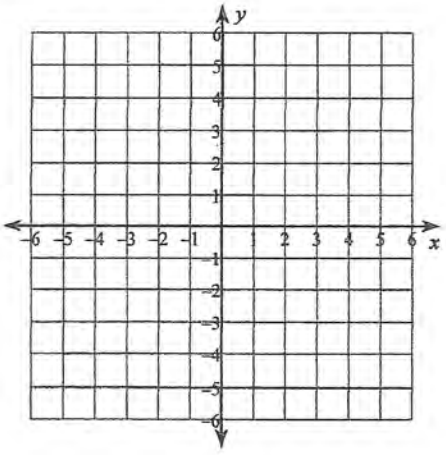


Week 5 (cont)

5) $y = -\frac{1}{2}x - 2$

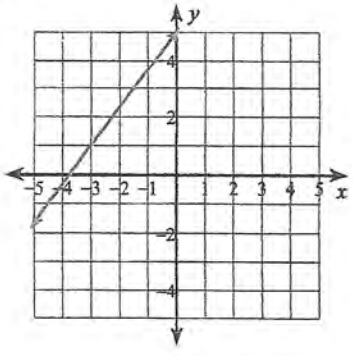


6) $y = -x + 1$

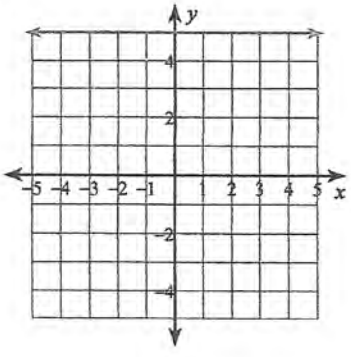


Write the slope-intercept form of the equation of each line.

7)



8)



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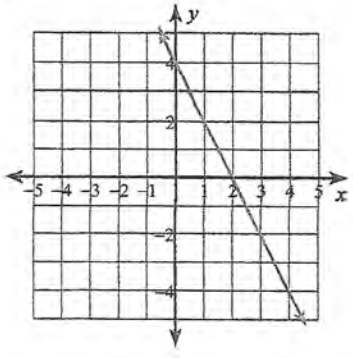

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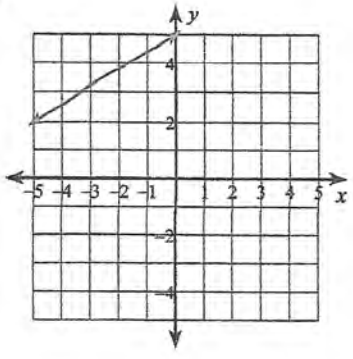
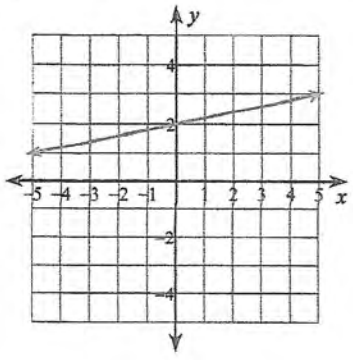
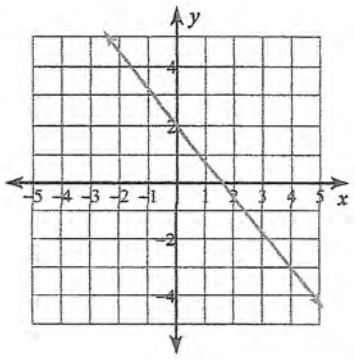


Week 5 (cont. 2)

11)



12)



Name:	Date:
Topic:	Class:

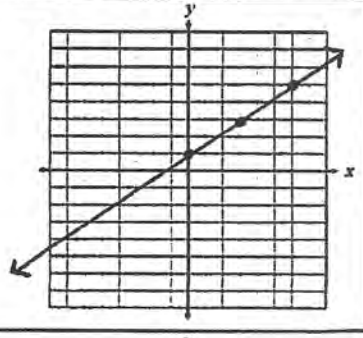
Main Ideas/Questions	Notes/Examples
Slope-Intercept Form	Linear equations are frequently written in **slope-intercept form:** $y = mx + b$ m = slope b = y-intercept
Steps to Graph	➢ **Step 1:** Graph the y-intercept. This is always point $(0, b)$. ➢ **Step 2:** Use the slope of the line to create more points. Remember slope is rise/run! ➢ **Step 3:** Use a ruler to draw a line that extends through the points, placing an arrow on both ends.

Directions: State the slope and y-intercept, then graph the equation.

1. $y = \frac{2}{3}x + 1$

m = 2/3

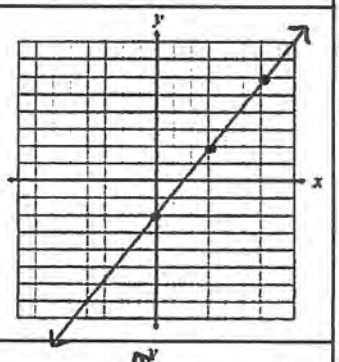
b = 1



2. $y = \frac{4}{3}x - 2$

m = 4/3

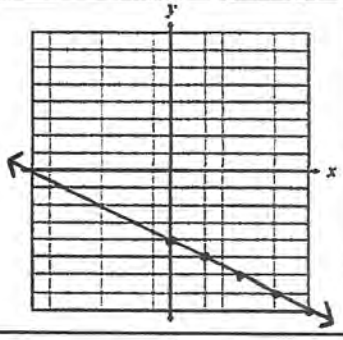
b = -2



3. $y = -\frac{1}{2}x - 4$

m = -1/2

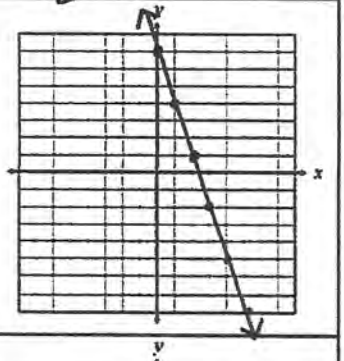
b = -4



4. $y = -3x + 7$

m = -3

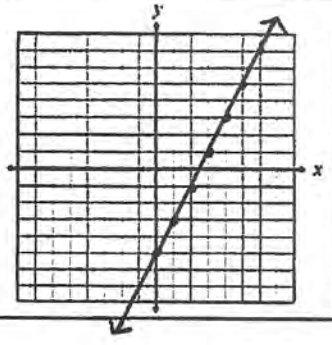
b = 7



5. $y = 2x - 5$

m = 2

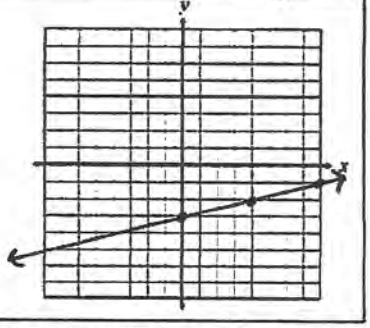
b = -5



6. $y = \frac{1}{4}x - 3$

m = 1/4

b = -3



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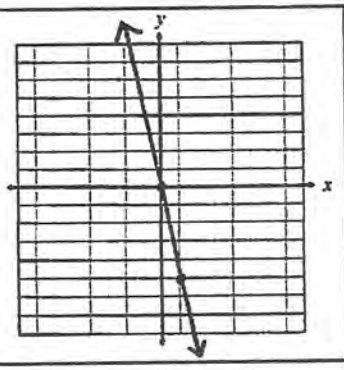
7. $y = -5x$

m = -5

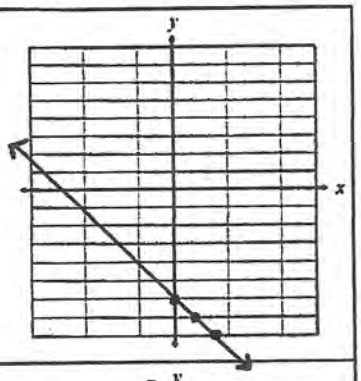
b = 0



8. $y = -x - 6$

m = -1

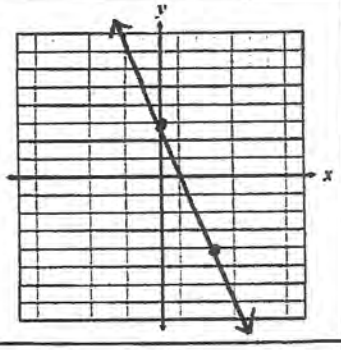
b = -6



9. $y = -\frac{7}{3}x + 3$

m = $-7/3$

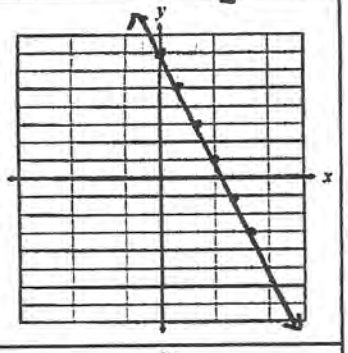
b = 3



10. $y = -2x + 7$

m = -2

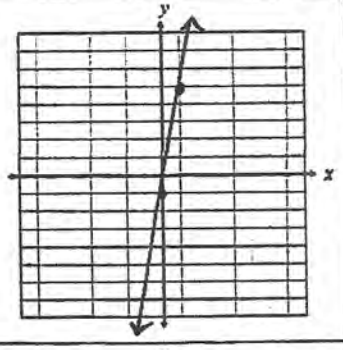
b = 7



11. $y = 6x - 1$

m = 6

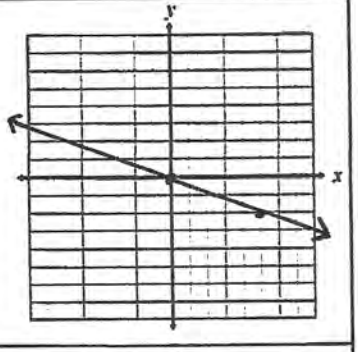
b = -1



12. $y = -\frac{2}{5}x$

m = $-2/5$

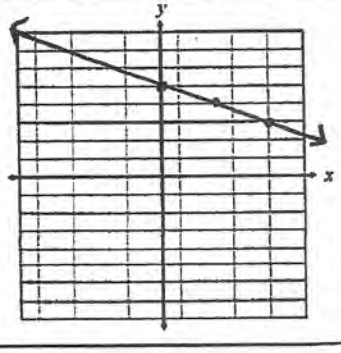
b = 0



13. $y = 5 - \frac{1}{3}x$

m = $-1/3$

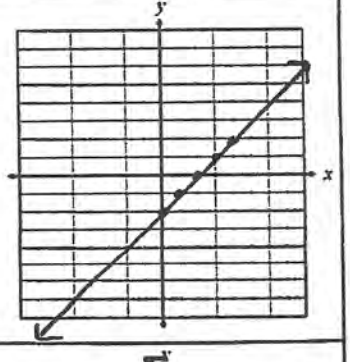
b = 5



14. $y = -2 + x$

m = 1

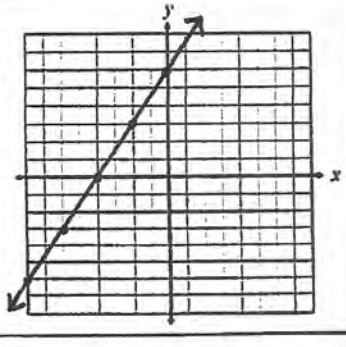
b = -2



15. $y = 6 + \frac{3}{2}x$

m = 3/2

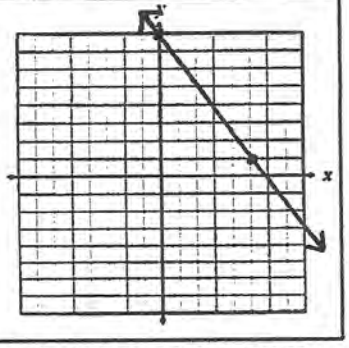
b = 6



16. $y = 8 - \frac{7}{5}x$

m = $-7/5$

b = 8



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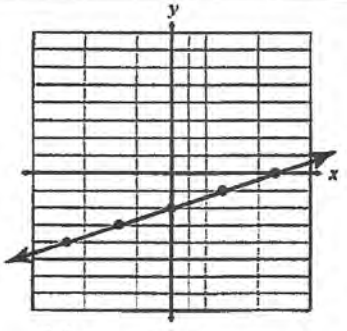
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Writing Linear Equations	Given a graph of a line, you can write it's equation in slope-intercept form by simpliy identifying it's slope and y-intercept.

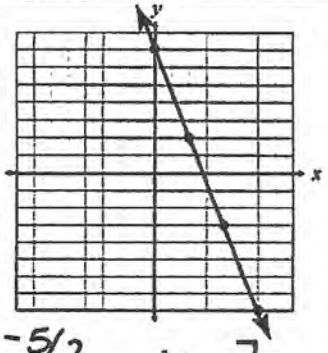
1.



$m =$ 1/3 $b =$ -2

Equation: $y = \frac{1}{3}x - 2$

2.

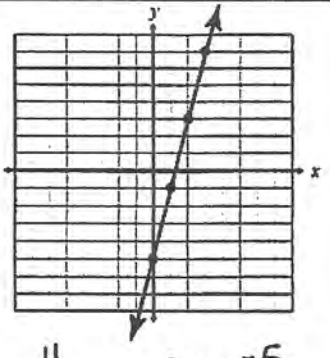


$m =$ -5/2 $b =$ 7

Equation: $y = -\frac{5}{2}x + 7$

You Try!

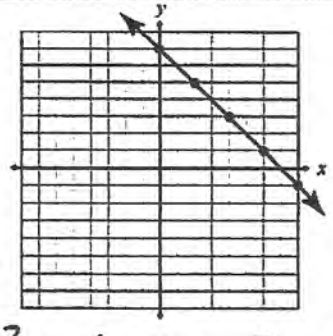
3.



$m =$ 4 $b =$ -5

Equation: $y = 4x - 5$

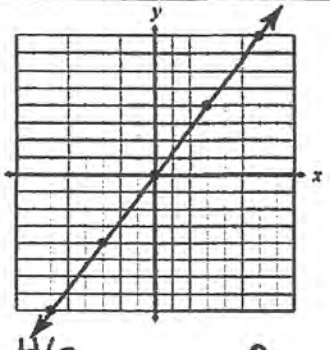
4.



$m =$ $\frac{-2}{2} = -1$ $b =$ 7

Equation: $y = -x + 7$

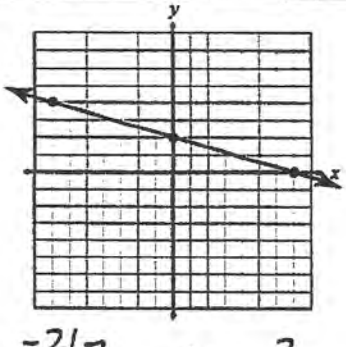
5.



$m =$ 4/3 $b =$ 0

Equation: $y = \frac{4}{3}x$

6.



$m =$ -2/7 $b =$ 2

Equation: $y = -\frac{2}{7}x + 2$

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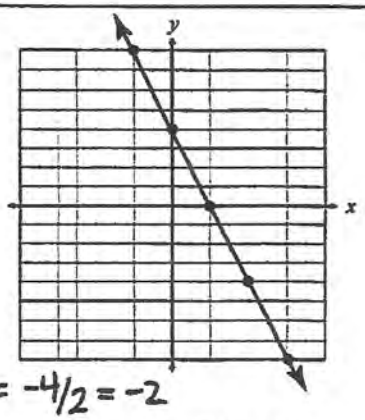
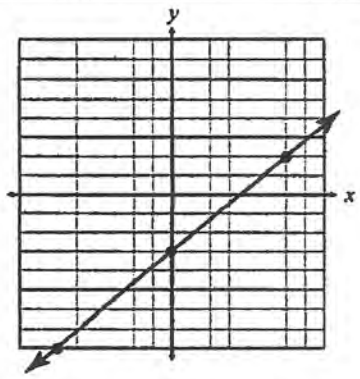
7.



$m = -4/2 = -2$

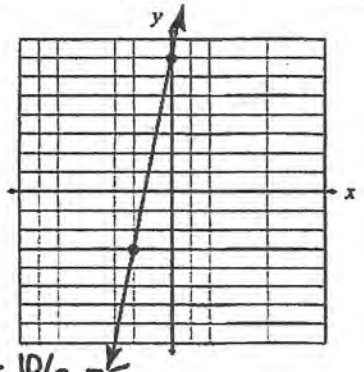
Equation: $y = -2x + 4$

8.



Equation: $y = 5/6x - 3$

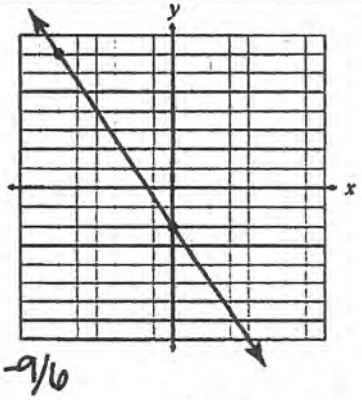
9.



$m = 10/2 = 5$

Equation: $y = 5x + 7$

10.

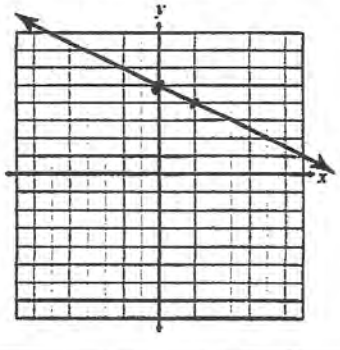


$m = -9/6$

Equation: $y = -3/2x - 2$

Choose the equation that best matches the line shown on the graph.

11.



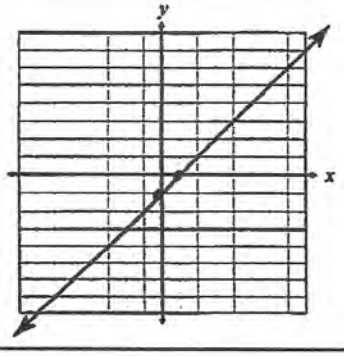
A. $y = 2x + 5$

B. $y = -2x + 5$

C. $y = \frac{1}{2}x + 5$

(D.) $y = -\frac{1}{2}x + 5$

12.



A. $y = x + 1$

(B.) $y = x - 1$

C. $y = -x + 1$

D. $y = -x - 1$

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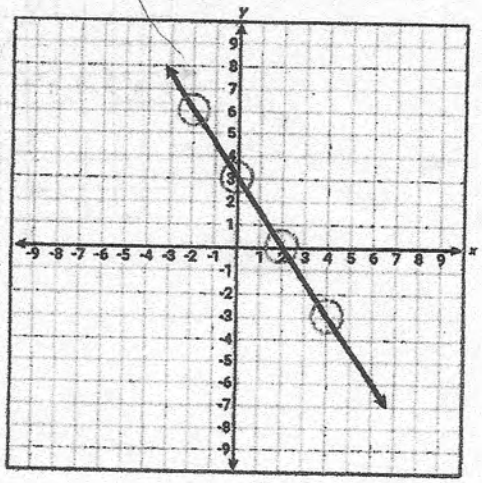
Week 6 - More Slope Practice

1. A graph of a linear function is shown. What is the y-intercept of this function?

Select **ONE** correct answer.

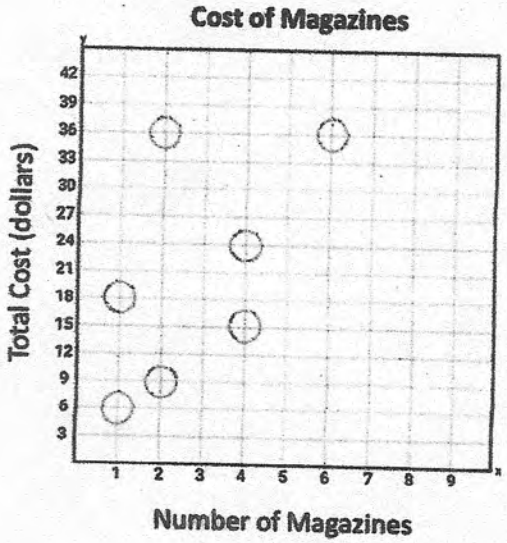


Incoming Alg 1 Summer Math

2. The cost of 3 magazines at the checkout line of a grocery store is $18. Each magazine has the same cost.

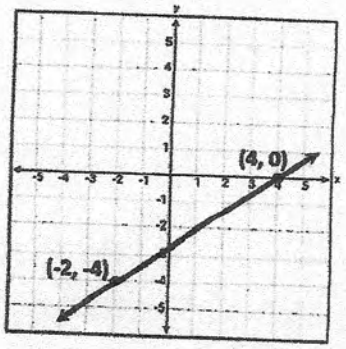
Which three points represents this rate?

Select **THREE** correct answers.



3 problems / day

3. The graph of a linear function is shown on the coordinate grid. What are the slope and y-intercept of the graph of this function?

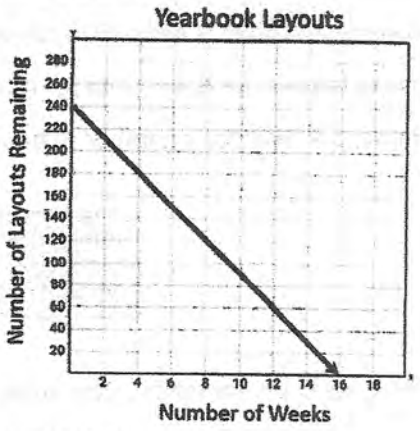


Select TWO correct answers.

- ☐ slope = $\frac{2}{3}$
- ☐ slope = $\frac{3}{2}$
- ☐ slope = $-\frac{2}{3}$
- ☐ y-intercept = $-\frac{5}{2}$
- ☐ y-intercept = $-\frac{8}{3}$
- ☐ y-intercept = 4

(4)

The graph shows the relationship between y, the number of layouts remaining for the yearbook staff to design, and x, the number of weeks spent working on the yearbook.



Choose the correct answer from each drop-down menu to complete the statements.

The yearbook staff completes [ ] layouts per week.

[15, 30]

The function that best represents the relationship shown in the graph is [ ].

(5)

A school principal is ordering a personalized yard sign to the honor the "Teacher of the Year".

- The principal pays a flat-rate creation fee of $38.
- The principal also pays $6.50 for each word in the sign.

Write a function that can be used to the find y, the total amount the principal pays in dollars for a sign with x words.

Enter your answer in the boxes provided.

(6)

The table shows a linear relationship between x and y.

x	y
4	1
8	4
12	7

Create an equation that describes the relationship shown in the table.

Move the correct answer to each box. Not all answers will be used.

$\frac{4}{3}$ $\frac{3}{4}$ 3 -2 1 2

$y = \square x + \square$

(7)

A commercial diver is hired to repair and maintain underwater equipment on oil rigs. A commercial diver charges a diving fee plus an hourly rate for a project. The table below shows the amount of money earned by a commercial diver for x number of hours of work on a project.

Number of Hours of Work, x	1	3	5	8
Amount of Money Earned, y	$200	$450	$700	$1,075

What does the commercial diver charge for the diving fee and hourly rate?

Choose the correct answer from each drop-down box to complete the sentence.

The commercial diver charges a diving fee of [ ] and [ ] per hour of work on a project.

(8)

Two families went to watch a professional hockey game.

- The first family bought 6 tickets and spent $12.50 at the concession stand.
- The second family bought 4 tickets and spent $54 at the concession stand.
- Both families spent the same total amount of money.
- The price of each hockey ticket was the same.

Write and solve an equation to find the price of the hockey ticket, x.

Move the correct answer to each box. Each answer may be used more than once. Not all answers will be used.

$6x - 12.50 = 4x - 54$ $6x + 12.50 = 4x + 54$ $10x = 66.50$ $20.75 $33.25 $6.65

Equation: [ ]

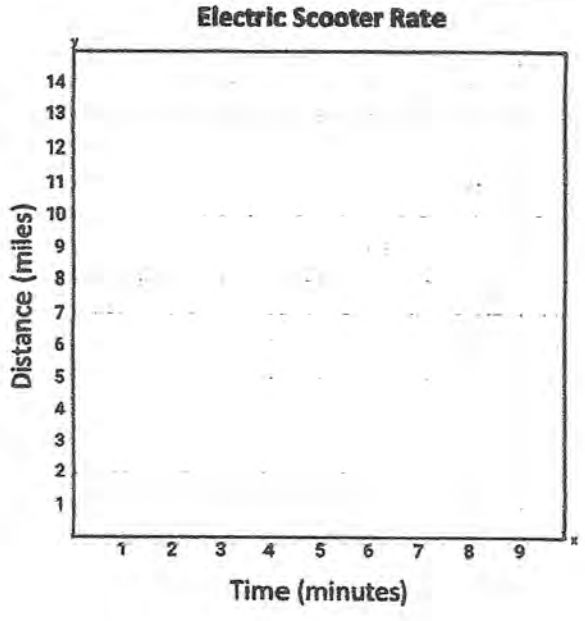
$x =$ [ ]

(9)

Tyreek rides his electric scooter to work. He travels 6 miles in 24 minutes. Create a graph that has a slope that represents Tyreek's average speed on his electric scooter.

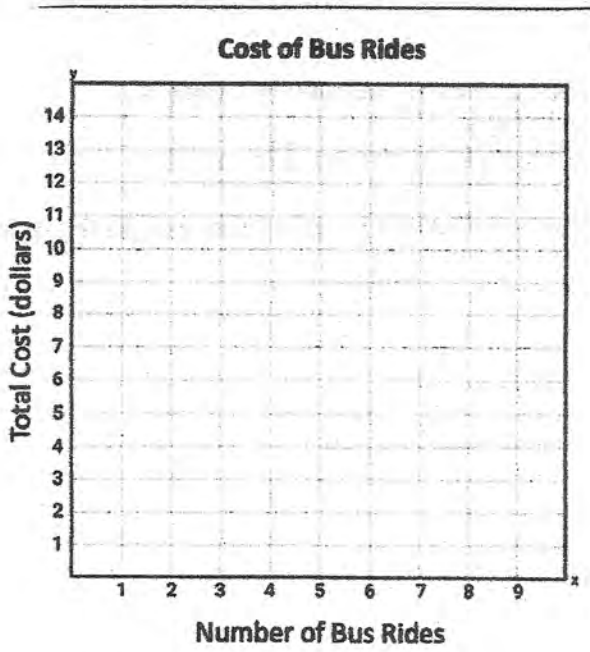
Select two points on the coordinate grid.

A line will connect the points.



(10) The Leona city bus system sells a 15-ride punch card for $37.50. Create a graph that has a slope that represents the cost of each bus ride.

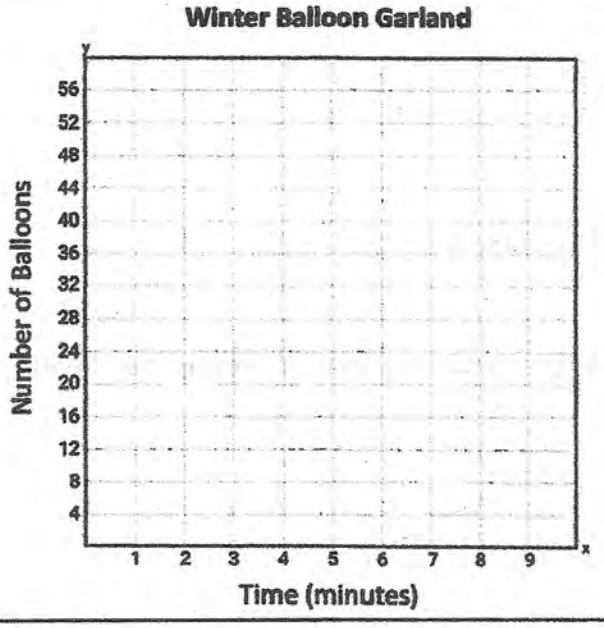
Select three points on the coordinate grid.



(11) Carla is creating a balloon garland for her middle school's winter dance. Carla has already placed 12 balloons on the garland and then adds 2 balloons every minute.

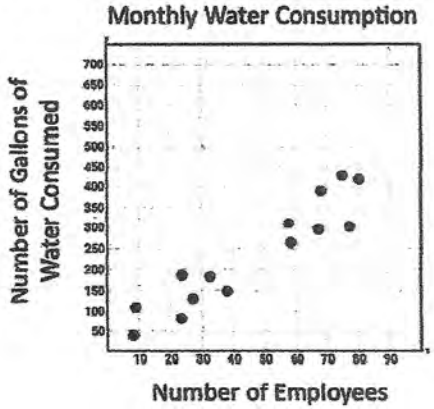
Graph a line that best represents the relationship between *x*, the number of minutes Carla has been working, and *y*, the number of balloons on the garland.

Select two points on the coordinate grid. A line will connect the points.



(12) The scatterplot shows the number of employees in 14 different office buildings and the number of gallons of water consumed from the office water cooler in a month.

Which statements are supported by the data shown in the scatter plot?



Select TWO correct answers.

- ☐ As the number of employees increases, the number of gallons of water consumed decreases.
- ☐ An office with 50 employees would likely consume 350 gallons of water.
- ☐ The data shows a strong positive association.
- ☐ An office building that consumed 475 gallons of water likely has 95 employees.
- ☐ There is non-linear association between the number of employees in an office building and the number of gallons of water consumed in a month.

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

Slope Applications

1. The table below shows the high temperatures (in degrees Fahrenheit) of a city during the first part of June.

Date	1	6	8	14
High Temperature	72	76	84	86

a) Find the rate of change in high temperature between June 1st and June 6th.

(1, 72) (6, 76)

$m = \frac{76-72}{6-1} = \frac{4}{5} =$ **0.8 deg/day**

b) Find the rate of change in high temperature between June 6th and June 8th.

(6, 76) (8, 84)

$m = \frac{84-76}{8-6} = \frac{8}{2} =$ **4 deg/day**

c) During which of these time intervals did the temperature rise faster?

The temp rose faster between June 6th and 8th.

2. Josh started a diet and decided to record his weight every other week.

Week	0	2	4	6	8
Weight (lbs)	224	219	221	215	215

a) Find the rate of change from week 0 to week 2.

$m = \frac{219-224}{2-0} = \frac{-5}{2} =$ **-2.5 lb/wk**

b) Find the rate of change from week 2 to week 4.

$m = \frac{221-219}{4-2} = \frac{2}{2} =$ **1 lb/wk**

c) Find the rate of change from week 4 to week 6.

$m = \frac{215-221}{6-4} = \frac{-6}{2} =$ **-3 lb/wk**

d) Find the rate of change from week 6 to week 8. Explain what this means.

$m = \frac{215-215}{8-6} = \frac{0}{2} =$ **0 lb/wk**

The rate of change is zero, meaning the weight didn't change.

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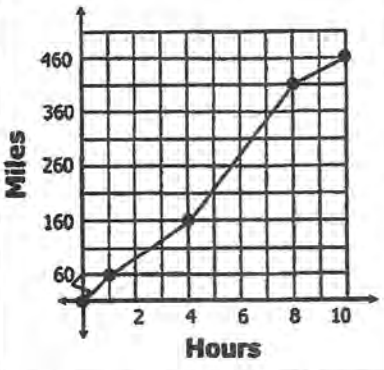
3. The graph below shows the number of miles driven after each hour of a road trip.



a) Find the rate of change from hour 1 to hour 4.

(1, 60)
(4, 160)

$m = \frac{160-60}{4-1} = \frac{100}{3}$

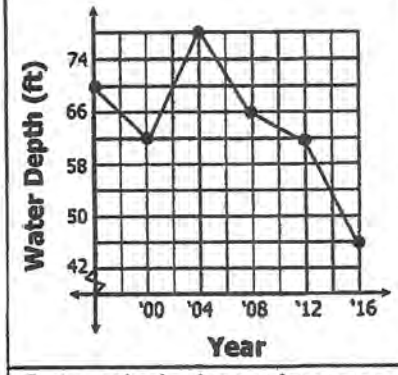
$= 33.\overline{3}$ mi/hr

b) Find the rate of change from hour 8 to hour 10.

(8, 410)
(10, 460)

$m = \frac{460-410}{10-8} = \frac{50}{2} = 25$ mi/hr

4. The graph below shows the change in the water depth of a lake through various years.



a) Find the rate of change from 2000 to 2004.

(2000, 62)
(2004, 78)

$m = \frac{78-62}{2004-2000} = \frac{16}{4} = 4$

$= 4$ ft/yr

b) Find the rate of change from 2012 to 2016.

(2012, 62)
(2016, 46)

$m = \frac{46-62}{2016-2012} = \frac{-16}{4} = -4$

5. Ava started a savings account with $500. After 6 months, her savings account balance was $731. Find the rate of change.

(0, 500)
(6, 731)

$m = \frac{731-500}{6-0} = \frac{231}{6} = \$38.50$/mo

6. An airplane is flying at an altitude of 36,000 feet when it begins it's descent for landing. Twelve minutes into its descent, it's at 29,400 feet. Find the rate of change in altitude.

(0, 36000)
(12, 29400)

$m = \frac{29400-36000}{12-0} = \frac{-6600}{12} = -550$ ft/min

7. Ten minutes into her workout, Laura had burned 98 calories. Twenty-five minutes in, she had burned 272 calories. Find the rate of change in calories burned between ten and twenty-five minutes.

(10, 98)
(25, 272)

$m = \frac{272-98}{25-10} = \frac{174}{15} = 11.6$ cal/min

8. The population of Buford was 16,200 in 2010 and 13,824 in 2016. Find the rate of change in population.

(2010, 16200)
(2016, 13824)

$m = \frac{13824-16200}{2016-2010} = \frac{-2376}{6} = -396$ people/year

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Unit: Linear Relationships
Homework 4

Name Answer Key

Date _____ Pd_____

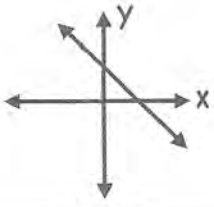
SLOPE-INTERCEPT FORM: PART I

Apply your knowledge of slope-intercept form to answer the questions below.

1. Harper is going to create a graph of the equation $y = -0.5x + 12$. Which of the following will be true about the graph?

a. The graph will contain the origin.
b. The graph will increase from left to right.
c. The graph will cross the x-axis at (12, 0).
(d.) The graph will have a slope of -0.5.

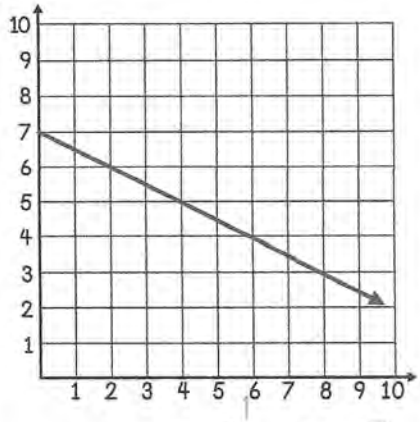
2. Khari graphed the line below. Which equation could represent Khari's graph?



a. $y = -2x - 3$
b. $y = 3x + 4$
(c.) $y = -4x + 3$
d. $y = -2x - 5$

For each graph below, record the slope, y-intercept, and equation in slope-intercept form.

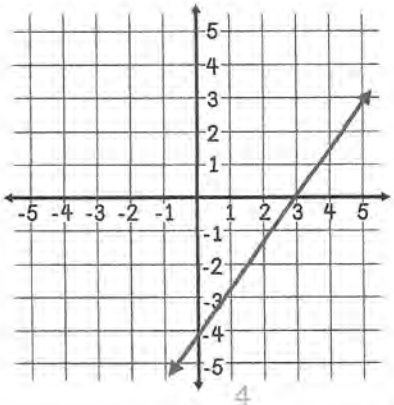
3.



m: $-\frac{1}{2}$ b: 7

equation: $y = -\frac{1}{2}x + 7$

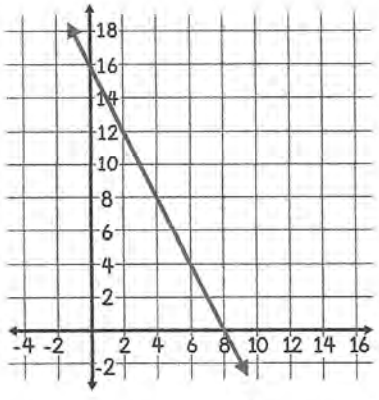
4.



m: $\frac{4}{3}$ b: -4

equation: $y = \frac{4}{3}x - 4$

5.

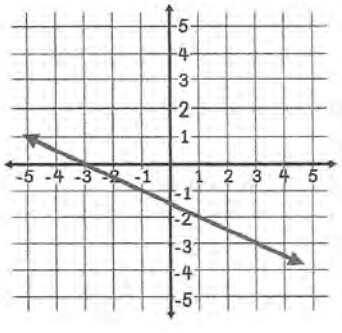


m: -2 b: 16

equation: $y = -2x + 16$

6. Li wrote the equation below to represent the graph shown. Explain her errors and correct the equation.

$y = \frac{1}{2}x - 3$



The slope should be negative and the y-intercept should be -1.5; $y = -\frac{1}{2}x - 1.5$

7. For a and b, write an equation in slope-intercept form that meets the given criteria.

a. A negative slope and passes through the origin

Sample answer: $y = -3x$

b. Slopes upward from left to right and has a y-intercept below the x-axis.

Sample answer: $y = 3x - 4$

8. Mr. Brown asked his students to write an equation that represents a line with a positive slope and a negative y-intercept. Circle the name of any student who correctly completed the task.

EZRA	(AALIYAH)	JACOBY	(PENNY)
$y = -5x + 2.5$	$y = 4x - 7$	$y = -3x - 11$	$y = \frac{4}{5}x - 20$

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Unit: Linear Relationships
Student Handout 5

Name Answer Key

Date _____ Pd_____

SLOPE-INTERCEPT FORM: PART II

Manny needs to write an equation in slope-intercept form to represent the linear relationship between x and y in the table shown at the right.

x	0	1	4	11	18
y	6	2	-10	-38	-66

a. Describe how Manny can find m, the slope.
Manny should select two ordered pairs and use the slope formula $\frac{y_2 - y_1}{x_2 - x_1}$.

b. Describe how Manny can find b, the y-intercept.
Manny should find the corresponding y-value on the table where $x = 0$.

c. Write an equation to represent the relationship.
$y = -4x + 6$

In 1-4, write an equation in slope-intercept form to represent each linear relationship.

1.

x	-5	0	5	10
y	-0.25	6	12.25	18.5

m: 1.25 b: 6

equation: $y = 1.25x + 6$

2.

x	2	4	6	8
y	50	90	130	170

m: 20 b: 10

equation: $y = 20x + 10$

3.

x	3	6	9	12
y	-6	-12	-18	-24

m: -2 b: 0

equation: $y = -2x$

4.

x	0	1	2	3
y	1	$1\frac{1}{5}$	$1\frac{2}{5}$	$1\frac{3}{5}$

m: $\frac{1}{5}$ b: 1

equation: $y = \frac{1}{5}x + 1$

5. Luke's family goes to the movies and purchases a large popcorn. They are debating whether to purchase any drinks. The table shows the total cost based on the number of drinks they decide to purchase.

DRINKS	TOTAL COST
0	$6.25
1	$10.00
2	$13.75
3	$17.50
4	$21.25

a. Find the slope and explain what it represents.
3.75; it is the value of $\frac{y_2 - y_1}{x_2 - x_1}$ and it represents the cost per drink.

b. Find the y-intercept and explain what it represents.
6.25; it is the value of y when x is 0 and it represents the cost of the large popcorn.

c. Write an equation in slope-intercept form: $y = 3.75x + 6.25$

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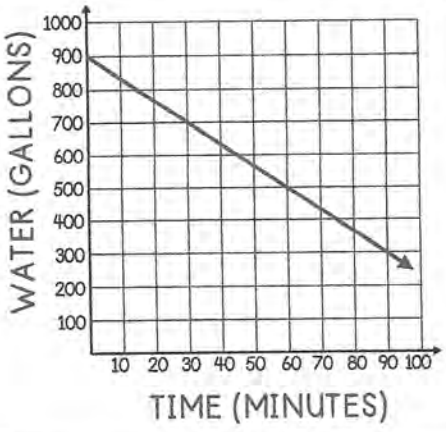
In 6-9, write an equation in slope-intercept form to represent the given situation.

6. At the end of the day, a pizzeria turns off its pizza oven. The table shows the linear relationship between the temperature of the oven and the first five minutes after it was turned off.

MINUTES	TEMPERATURE (°F)
1	425
2	400
3	375
4	350
5	325

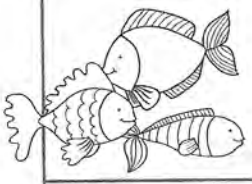
m: -25 b: 450 equation: $y = -25x + 450$

7. The graph shows the relationship between the number of gallons of water remaining in a storage tank and the number of minutes it has been draining.



m: $-\frac{20}{3}$ b: 900 equation: $y = -\frac{20}{3}x + 900$

8. Carly wants to buy some fish to keep in her room. At a local pet store, customers can pay $12.50 for a fish tank and $0.20 for each fish they purchase. Write an equation to represent the relationship between t, the total cost and n, the number of fish purchased.



m: 0.20 b: 12.50

equation: $t = 0.2n + 12.5$

9. Danny is diving for rings at the bottom of the pool and is 8.7 feet below the surface of the water. He grabs a ring and ascends 1.3 feet per second. Write an equation to represent the relationship between s, the number of seconds and f, Danny's depth in feet relative to the surface of the water.

m: 1.3 b: -8.7

equation: $f = 1.3s - 8.7$

10. A karate academy charges a monthly membership fee plus an additional fee per karate class. The table shows the linear relationship between the number of karate classes taken and the total cost including the membership fee. Find the error in each statement and rewrite them to make them true.

# OF CLASSES	1	5	8	14	20
TOTAL COST	36	60	78	114	150

a. The cost of each class is $8. The cost of each class is $6.

b. The monthly membership fee is $36. The monthly membership fee is $30.

c. A student who attended 30 classes would pay $220. 30 classes would cost $210.

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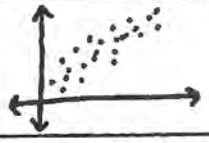
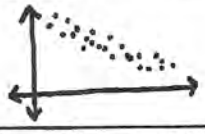
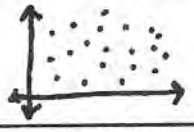
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Scatter Plot	A graph that shows the relationship between two sets of data.

Types of Relationships

Positive	Negative	None
		

Determine the type of relationship most likely shown by the data.

1. The size of a home versus the size of its lot. None
2. Number of passengers on a plane versus number of suitcases. Positive
3. Number of days into fall versus number of leaves on the trees. Negative

Drawing Scatter Plots

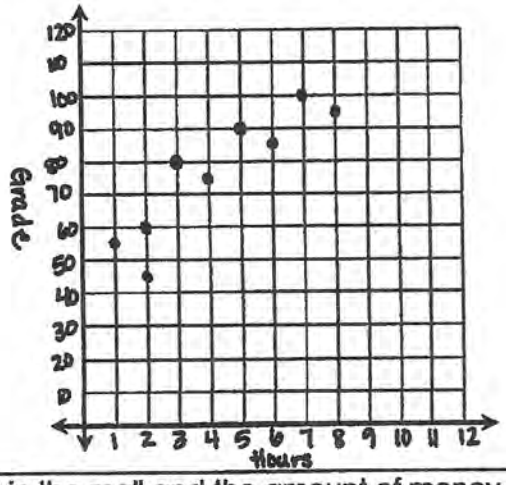
Relationship:

4. Positive
5. None

Draw the scatter plot and identify the relationship shown.

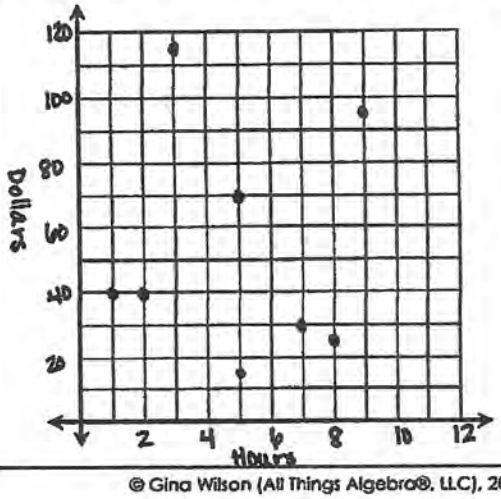
4. The number of hours a student studied for a test and their grade:

Hours	Grade
3	80
5	90
2	45
6	85
8	95
1	55
2	60
7	100
4	75



5. The number of hours a person spent in the mall and the amount of money they spent:

Hours	Dollars
1	40
8	25
7	30
5	70
9	95
2	40
3	115
5	15



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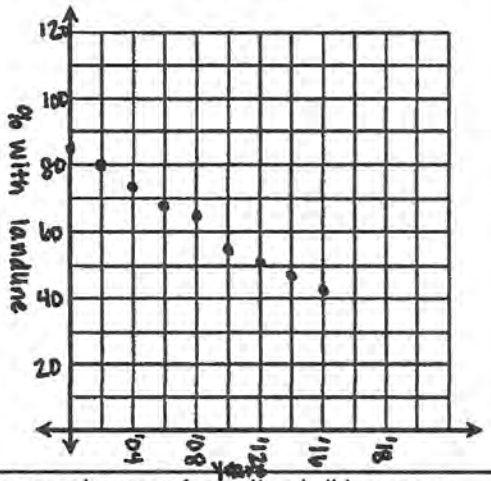
Relationship:

6. Negative

7. Positive

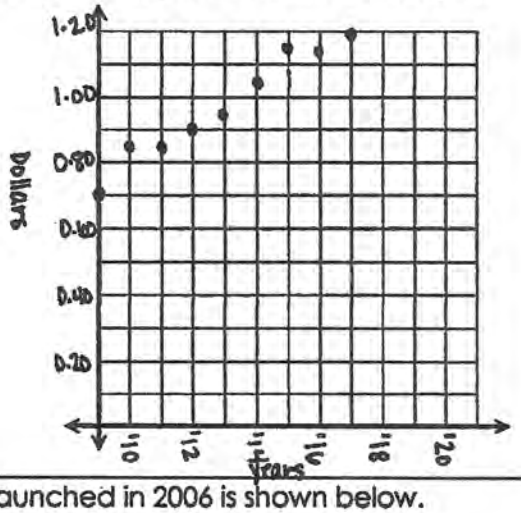
6. The percent of households in a city with a landline telephone:

Year	% of homes with a landline
2000	84
2002	80
2004	73
2006	68
2008	65
2010	55
2012	51
2014	47
2016	42



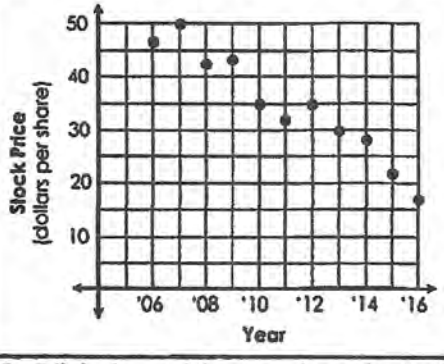
7. The toll to drive on a section of highway each year since the toll began:

Year	Dollars
2009	$0.70
2010	$0.85
2011	$0.85
2012	$0.90
2013	$0.95
2014	$1.05
2015	$1.15
2016	$1.15
2017	$1.20



Reading Scatter Plots

8. A company's stock price since it launched in 2006 is shown below.

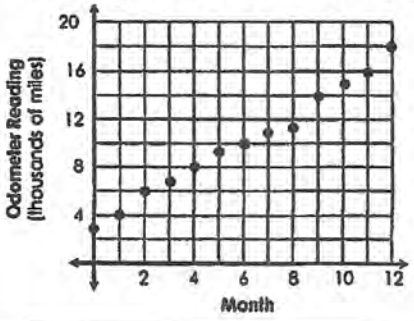


a) What is the approximate stock price in 2015? $22

b) In what year was the stock price $35 per share? 2010 & 2012

c) What is the relationship? Negative

9. Olivia bought a used car in April. The graph below shows the odometer reading each month after she bought the car.



a) Approximately how many miles were on the car when she bought it? 3,000 miles

b) Approximately how many miles were on the car in July? 6,800 miles

c) In what month did the car reach 14,000 miles? January

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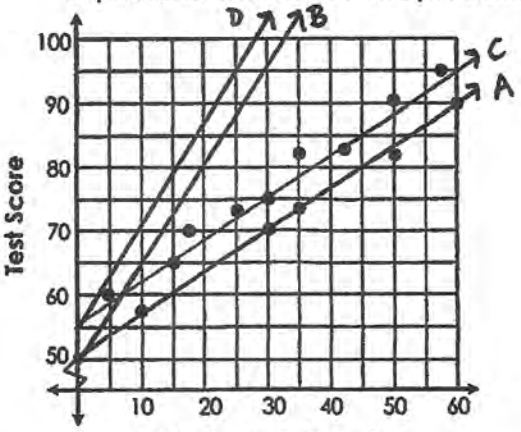
Name:	Date:
Topic:	Class:

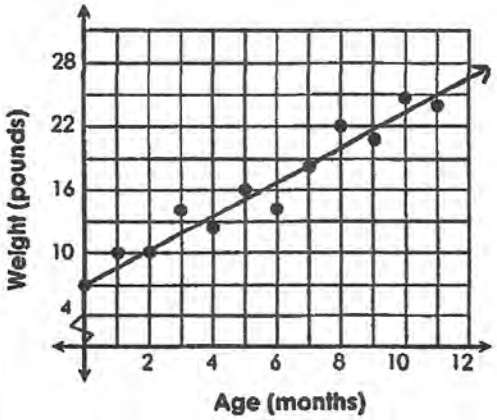
Main Ideas/Questions	Notes/Examples
Line of Best Fit	A line drawn on a scatterplot that is close to most of the data points. Can be used to estimate data. **Example:** The graph below shows the relationship between minutes spent studying and the test scores for a math class. Which line best represents the data? Graph each line to justify your answer.  **Line A:** $y = \frac{2}{3}x + 50$ **Line B:** $y = \frac{3}{2}x + 50$ **Line C:** $y = \frac{2}{3}x + 55$ **Line D:** $y = \frac{3}{2}x + 55$

Finding the Line of Best Fit

1. **Draw a line** that is close to most data points. It should "split" the data.
2. Find the **slope** between any two points on the line. (Use the slope formula!)
3. Identify the ***y*-intercept**, the point where the line intersects the *y*-axis.
4. Write the equation in **slope-intercept form** ($y = mx + b$) where m is the is the slope and b is the *y*-intercept.

Examples

1. The graph below shows the ages and weights of twelve babies.



a) Write an equation for the line of best fit.

(0, 7) and (7, 18)

$m = \frac{18-7}{7-0} = \frac{11}{7}$; $b = 7$

$y = \frac{11}{7}x + 7$

* Answers may vary *

b) Estimate the weight of a baby that is 12 months old. ($x = 12$)

$y = \frac{11}{7}(12) + 7 \approx$ 26 lb

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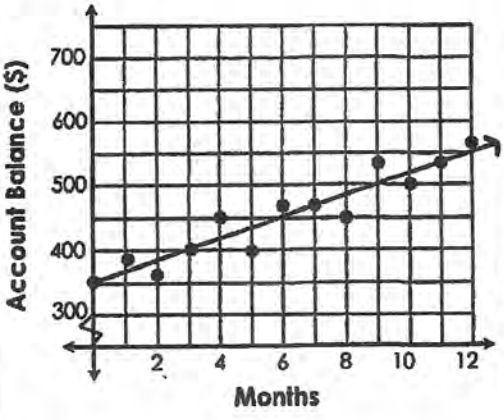
2. Beth started a new bank account. The graph below shows the monthly balance of the account in its first year.



a) Write an equation for the line of best fit.

(0, 350) and (7, 470)

$m = \frac{470-350}{7-0} = \frac{120}{7}$; $b = 350$

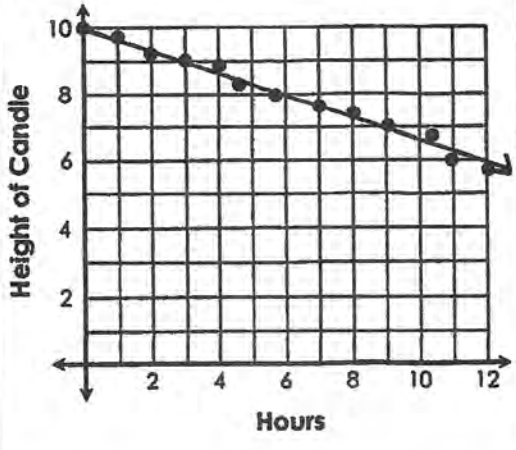
$y = \frac{120}{7}x + 350$

Answers may vary

b) Estimate the balance of the account after two years. ($x = 24$)

$y = \frac{120}{7}(24) + 350 \approx \$761.43$

3. A 10-inch tall candle is lit. The graph below shows its height after each hour.



a) Write an equation for the line of best fit.

(0, 10) and (3, 9)

$m = \frac{9-10}{3-0} = \frac{-1}{3}$; $b = 10$

$y = -\frac{1}{3}x + 10$

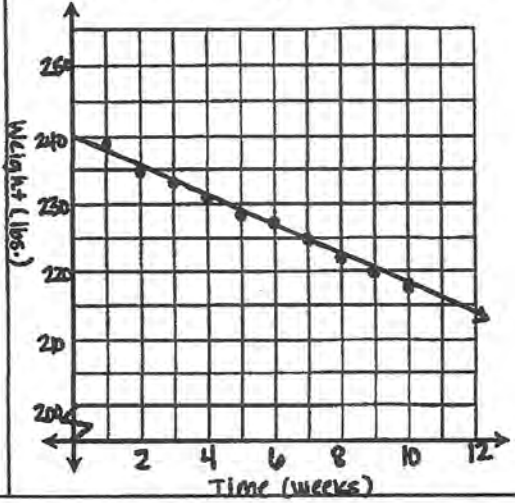
Answers may vary

b) Estimate the height of the candle after 15 hours. ($x = 15$)

$y = -\frac{1}{3}(15) + 10 =$ 5 in

4. The table to the left shows Nick's weight each week into his diet. Make a scatter plot of this data.

Time (weeks)	Weight (lbs)
1	238
2	235
3	233
4	231
5	228
6	227
7	225
8	222
9	220
10	217



a) Write an equation for the line of best fit.

(3, 233) and (7, 225)

$m = \frac{225-233}{7-3} = \frac{-8}{4} = -2$

$b = 240$

$y = -2x + 240$

b) Estimate Nick's weight after 24 weeks. ($x = 24$)

$y = -2(24) + 240 =$ 192 lb

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Unit: Linear Relationships
Homework 5

Name Answer Key

Date _____ Pd_____

SLOPE-INTERCEPT FORM: PART II

In 1-2, write an equation in slope-intercept form to represent each linear relationship.

1.

x	0	5	10	15
y	-2	40.5	83	125.5

m: 8.5 b: -2

equation: $y = 8.5x - 2$

2.

x	3	6	9	12
y	5	-1	-7	-13

m: -2 b: 11

equation: $y = -2x + 11$

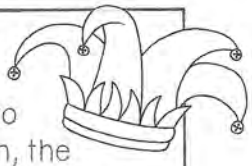
Apply your knowledge of slope-intercept form to answer each of the following questions.

3. Mia has $50 on a gift card to her favorite coffee shop. Each time she visits the coffee shop she spends $3.75 on her favorite drink. Write an equation to represent the relationship between n, the number of times she visits the coffee shop, and b, the total balance on her gift card.

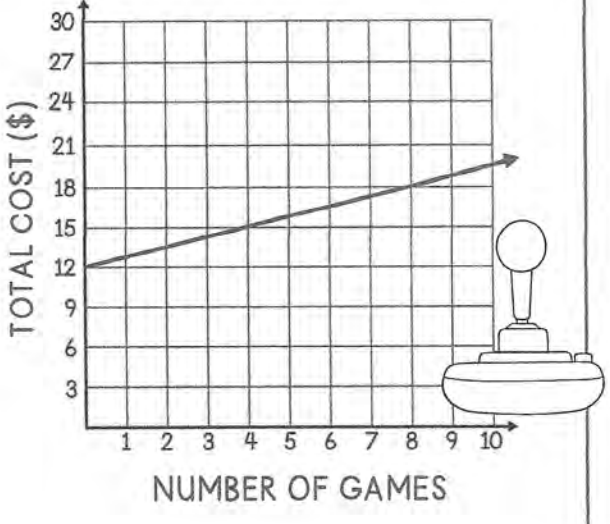
$b = -3.75n + 50$

4. A magician charges a $30 fee to cover travel and expenses, plus $19.99 per hour. Write an equation to represent the relationship between h, the number of hours, and t, the total charge for the magician.

$t = 19.99h + 30$



Robert pays for his family to go to the arcade. He pays an entrance fee for his group and an additional amount per game that his family plays as shown in the graph. Use the graph to answer 5-7.



5. Find the slope and interpret its meaning.

The slope is $\frac{3}{4}$; the arcade charges $3 for every 4 games played, or $0.75 per game.

6. Find the y-intercept and interpret its meaning.

The y-intercept is 12; the cost of the entrance fee is $12.

7. Write an equation to represent the relationship between x, the number of games and y, the total cost.

$y = \frac{3}{4}x + 12$

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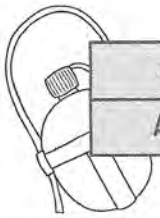
8. A hiker hikes at a steady rate throughout the day on a mountain. Which student wrote a correct equation to represent the linear relationship shown on the table between x, the number of hours hiked and y, the current altitude of the climber?



# HOURS HIKED	1	2	3	5	8
ALTITUDE (FEET)	5,650	5,525	5,400	5,150	4,775

MATEO	JULIE	OLIVER
$y = 125x + 5{,}775$	$y = -125x + 5{,}775$	$y = -125x + 5{,}650$

The table shows the linear relationship between the number of pages left to read in a novel and the number of hours a student has already spent reading the novel. Mark each statement as true or false. If false, rewrite the statement correctly.

HOURS READ	PAGES REMAINING
1	644
4	500
8	308
12	116
14	20

True 9. The student reads at a rate of 48 pages per hour.

False 10. The number of pages in the novel is 644.
The novel has 692 pages.

True 11. The situation can be represented by the equation $y = -48x + 692$.

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Unit: Linear Relationships
Student Handout 6

Name Answer Key

Date _____ Pd_____

MULTIPLE REPRESENTATIONS

Practice representing linear relationships in multiple ways with the following examples. Use the representation given to help you fill in the others.

[VERBAL DESCRIPTION]

A baby giraffe measures 6 feet tall when it is born and grows an average of $\frac{1}{2}$ foot each month. What is the relationship between x, the number of months and y, the height of the giraffe?

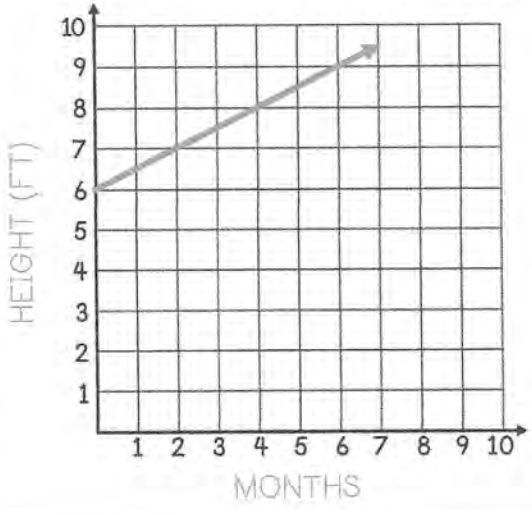
[EQUATION]

$y = 0.5x + 6$

[TABLE]

MONTHS	PROCESS	HEIGHT (FT)
0	0.5(0) + 6	6
1	0.5(1) + 6	6.5
2	0.5(2) + 6	7
3	0.5(3) + 6	7.5
4	0.5(4) + 6	8
5	0.5(5) + 6	8.5
6	0.5(6) + 6	9

[GRAPH]



Use the representations in the example above to answer 1-5.

1. Explain how you found ordered pairs to create your graph.

Sample: From the x and y-values in the table.

2. What is the slope of the graph, and what does it represent?

The slope is 0.5; it represents the rate the giraffe grows each month.

3. What is the y-intercept of the graph, and what does it represent?

The y-intercept is (0, 6); it represents the initial height of the giraffe at birth.

4. What does the ordered pair (9, 10.5) represent in the context of the situation?

After 9 months, the giraffe would be 10.5 feet tall.

5. If the giraffe is 12 feet tall, how many months old is it?

12 months

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Use the given information for each situation below to fill in the missing representations.

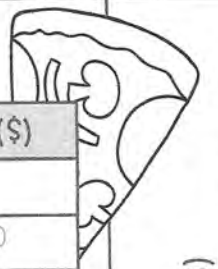
[VERBAL DESCRIPTION]

Sample answer: Joey's Pizza Parlor charges $12 per pizza plus $1.50 for each topping.

[EQUATION]

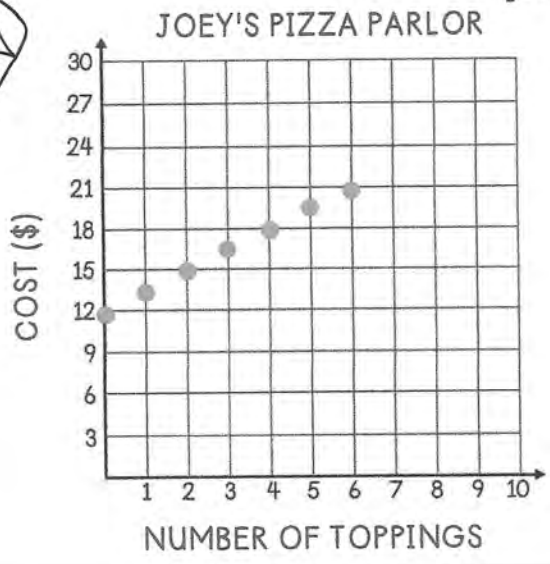
$$y = 12 + 1.5x$$

[TABLE]



TOPPINGS	PROCESS	COST ($)
0	12 + 1.5(0)	12
1	12 + 1.5(1)	13.50
2	12 + 1.5(2)	15
3	12 + 1.5(3)	16.50
4	12 + 1.5(4)	18
5	12 + 1.5(5)	19.50
6	12 + 1.5(6)	21

[GRAPH]



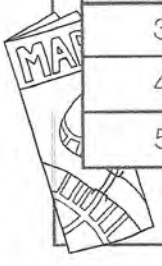
[VERBAL DESCRIPTION]

Sample answer: The Smiths started with 9 gallons of gas in their car and use 0.05 gallons of gas each mile driven.

[EQUATION]

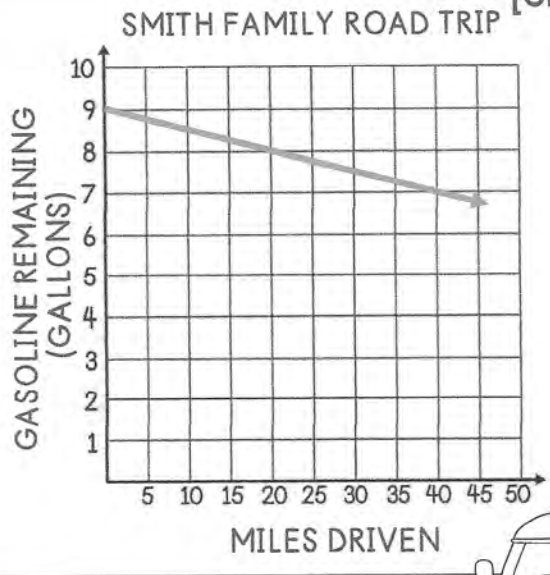
$$y = -0.05x + 9$$

[TABLE]



MILES DRIVEN	PROCESS	GASOLINE REMAINING (GALLONS)
10	-0.05(10) + 9	8.5
20	-0.05(20) + 9	8
30	-0.05(30) + 9	7.5
40	-0.05(40) + 9	7
50	-0.05(50) + 9	6.5

[GRAPH]



Summarize today's lesson:

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Unit: Linear Relationships
Homework 6

Name Answer Key

Date _____ Pd_____

MULTIPLE REPRESENTATIONS

Andy's Appliance Repair charges a set fee for house calls and an additional fee for each hour of labor. Use the graph shown below to fill in the missing representations.

[VERBAL DESCRIPTION]

Andy's Appliance Repair charges $20 for a house call plus $60 per hour.

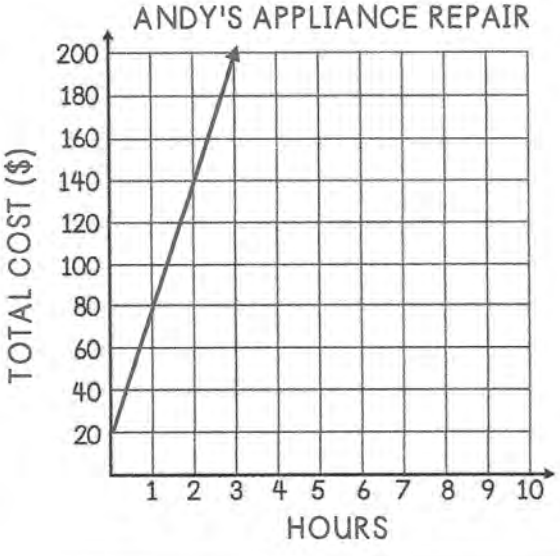
[EQUATION]

$y = 60x + 20$

[TABLE]

HOURS	PROCESS	COST ($)
0	$y = 60(0) + 20$	20
1	$y = 60(1) + 20$	80
2	$y = 60(2) + 20$	140
3	$y = 60(3) + 20$	200
4	$y = 60(4) + 20$	260
5	$y = 60(5) + 20$	320
6	$y = 60(6) + 20$	380

[GRAPH]



1. What is the slope of the graph, and what does it represent?

The slope is 60, and it represents the cost per hour.

2. What is the y-intercept of the graph, and what does it represent?

The y-intercept is 20, and it represents the set fee for a house call.

3. What does the ordered pair (7, 440) represent in the context of the situation?

After 7 hours, the total cost for a repair would be $440.

4. How much would it cost for a 9-hour repair?

$560

5. If the cost of a repair was $740, how many hours did it take?

12 hours

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Kuta Software - Infinite Pre-Algebra

Name_____

Week 7

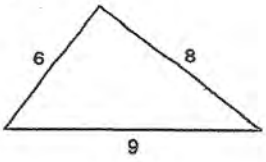
The Pythagorean Theorem

2-3 problems/day

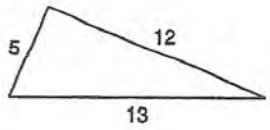
Date_____ Period____

Do the following lengths form a right triangle?

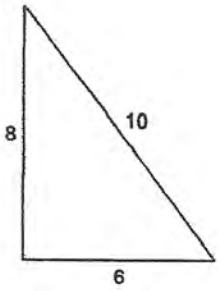
1)



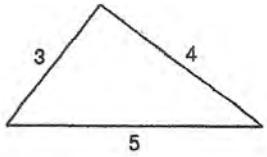
2)



3)



4)

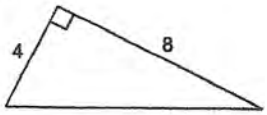


5) $a = 6.4,\ b = 12,\ c = 12.2$

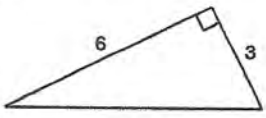
6) $a = 2.1,\ b = 7.2,\ c = 7.5$

Find each missing length to the nearest tenth.

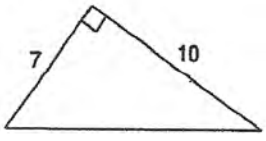
7)



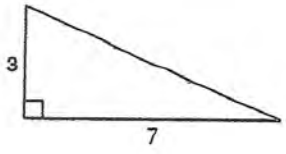
8)



9)

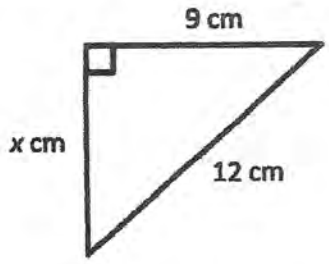


10)



Week 7
Pythagorean Theorem

11) A right triangle and two of its side lengths are shown in the diagram.



Write and solve an equation to find the missing side length of the right triangle. Round to the nearest tenth, if necessary.

Move the correct answer to each box. Each answer may be used more than once. Not all answers will be used.

$x^2 + 9^2 = 12^2$ | $x + 9 = 12$ | $9^2 + 12^2 = x^2$ | 15 cm | 63 cm | 7.9 cm | 8.6 cm

Equation: [ ]

x = [ ]

12) Josiah is designing a rectangular flag for a neighborhood Capture the Flag game. The flag is 16 inches long and 12 inches wide. Josiah plans to paint a blue stripe along the diagonal of the flag. What is the length of the diagonal of his flag in inches?

Enter your answer in the space provided.

Incoming Alg 1 Summer Math

Week 7

Relations & Functions

13) A relation contains the points (-6, -2), (-3, -1), (0, 2), (5, -2), and (9, -7). Create a statement that accurately describes this relation.

Choose the correct answer from each drop-down menu to complete the statement.

The relation [represents, does not represent] y as a function of x, because each value of [x, y] is associated with a single value of [x, y].

14) Which representations do not show y as a function of x?

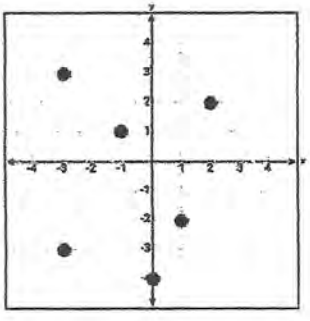
Select **TWO** correct answers.

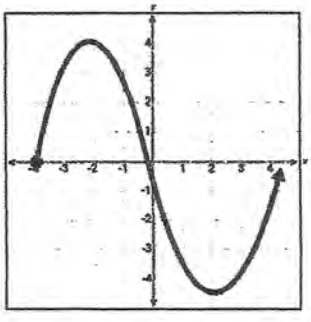
{(1, -5), (6, -5), (10, -5), (18, -5)}

{(-7, -9), (-4, 4), (-9, -12), (-4, 0)}

x	y
4	6
6	9
7	10.5
11	16.5

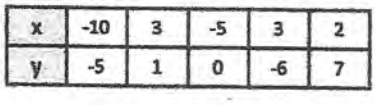
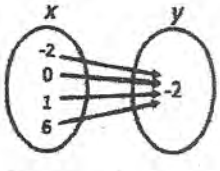
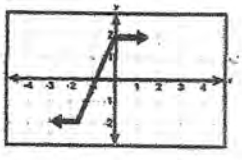
x	y
-2	-32
-1	-8
0	0
1	-8



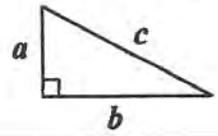


15) Which of the relations shown represent y as a function of x?

Select the correct answer in each row.

Relation	Function	Not a Function
	☐	☐
	☐	☐
	☐	☐

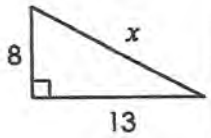
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
PYTHAGOREAN THEOREM 	• Used to find the missing Side of a right triangle. • Sides a and b are called legs. • Side c is called the hypotenuse. • For any right triangle: $a^2+b^2=c^2$.

Examples

Directions: Find the value of x. Round your answer to the nearest tenth.

1.



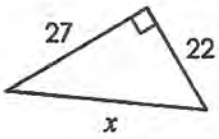
$8^2+13^2=x^2$

$64+169=x^2$

$233=x^2$

$x=15.3$ $(\sqrt{233})$

2.



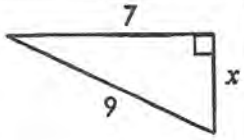
$22^2+27^2=x^2$

$484+729=x^2$

$1213=x^2$

$x=34.8$ $(\sqrt{1213})$

3.



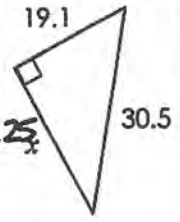
$7^2+x^2=9^2$

$49+x^2=81$

$x^2=32$

$x=5.7$ $(4\sqrt{2})$

4.



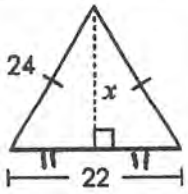
$19.1^2+x^2=30.5^2$

$364.81+x^2=930.25$

$x^2=565.44$

$x=23.8$

5.



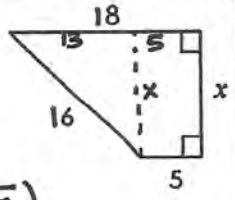
$11^2+x^2=24^2$

$121+x^2=576$

$x^2=455$

$x=21.3$ $(\sqrt{456})$

6.



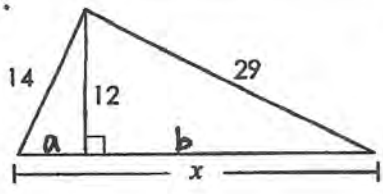
$x^2+13^2=16^2$

$x^2+169=256$

$x^2=87$

$x=9.3$ $(\sqrt{87})$

7.



$12^2+a^2=14^2$

$144+a^2=196$

$a^2=52$

$a=7.2$

$12^2+b^2=29^2$

$144+b^2=841$

$b^2=697$

$b=26.4$

$x=7.2+26.4=33.6$

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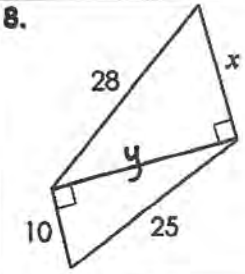
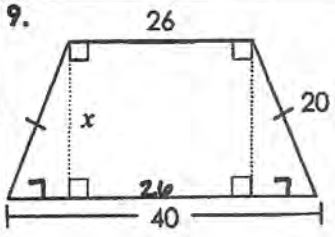
8.



$10^2 + y^2 = 25^2$
$100 + y^2 = 625$
$y^2 = 525$
$y = 22.9$

$x^2 + 22.9^2 = 28^2$
$x^2 + 524.41 = 784$
$x^2 = 259.59$
$x = 16.1$

9.

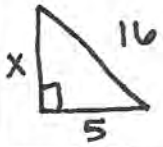


$7^2 + x^2 = 20^2$
$49 + x^2 = 400$
$x^2 = 351$
$x = 18.7$ $(3\sqrt{39})$

APPLICATIONS

Directions: Draw a picture, then solve for the missing side.

10. A roofer leaned a 16-foot ladder against a house. If the base of the ladder is 5 feet from the house, how high up the house does the ladder reach?



$5^2 + x^2 = 16^2$
$25 + x^2 = 256$
$x^2 = 231$
$x = 15.2$

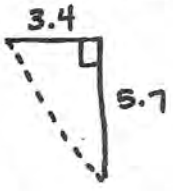
15.2 ft

11. Kurt is building a rectangular deck. If the dimensions of the deck are 10 feet by 23 feet, what is the length of the diagonal of the deck?

$10^2 + 23^2 = x^2$
$100 + 529 = x^2$
$629 = x^2$
$x = 25.1$

25.1 ft

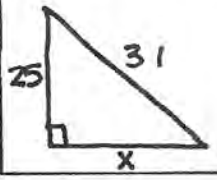
12. Ashley jogged 3.4 miles east, then 5.7 miles south. How far is Ashley from her starting point?



$3.4^2 + 5.7^2 = x^2$
$11.56 + 32.49 = x^2$
$44.05 = x^2$
$x = 6.6$

6.6 mi

13. A 31-foot support wire is attached from the top of a 25 foot telephone pole to a point on the ground. How far from the base of the pole does the wire meet the ground?



$25^2 + x^2 = 31$
$625 + x^2 = 961$
$x^2 = 336$
$x = 18.3$

18.3 ft

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
PYTHAGOREAN THEOREM Converse	**Given a triangle with sides a, b, and c:** • If $c^2 = a^2 + b^2$, then the triangle is right. • If $c^2 > a^2 + b^2$, then the triangle is obtuse. • If $c^2 < a^2 + b^2$, then the triangle is acute. **Always keep "c^2" on the LEFT side to avoid confusion when classifying!**
Examples	**Directions:** First, determine if the three side lengths could form a triangle. (Recall from earlier, the sum of the two smaller sides must be greater than the third side). If yes, classify the triangle further as acute, right, or obtuse.

1. 3, 7, 9 → $3+7>9$ ✓

$9^2 \;?\; 3^2+7^2$

$81 \;?\; 9+49$

$81 > 58$

- ☐ Not a △
- ☐ Acute
- ☐ Right
- ☑ Obtuse

2. 20, 21, 29 → $20+21>29$ ✓

$29^2 \;?\; 20^2+21^2$

$841 \;?\; 841$

$841 = 841$

- ☐ Not a △
- ☐ Acute
- ☑ Right
- ☐ Obtuse

3. 4, 11, 16 → $4+11>16$ NO

- ☑ Not a △
- ☐ Acute
- ☐ Right
- ☐ Obtuse

4. 17, 17, 22 → $17+17>22$ ✓

$22^2 \quad 17^2+17^2$

$484 \quad 289+289$

$484 < 578$

- ☐ Not a △
- ☑ Acute
- ☐ Right
- ☐ Obtuse

5. 18, 24, 30 → $18+24>30$ ✓

$30^2 \quad 18^2+24^2$

$900 = 900$

- ☐ Not a △
- ☐ Acute
- ☑ Right
- ☐ Obtuse

6. 8, 15, 23 → $8+15>23$ NO

- ☑ Not a △
- ☐ Acute
- ☐ Right
- ☐ Obtuse

7. 31, 35, 39 → $31+35>39$ ✓

$39^2 \quad 31^2+35^2$

$1521 < 2186$

- ☐ Not a △
- ☑ Acute
- ☐ Right
- ☐ Obtuse

8. 11, 19, 28 → $11+19>28$ ✓

$28^2 \quad 11^2+19^2$

$784 > 482$

- ☐ Not a △
- ☐ Acute
- ☐ Right
- ☑ Obtuse

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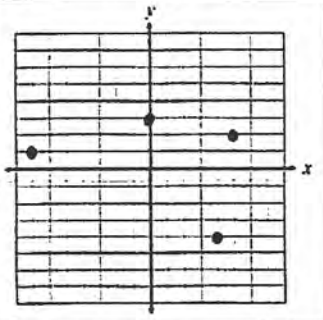
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
RELATION	A set of ordered pairs. Example: $\{(-6,2), (5,-1), (0,6), (-4,1)\}$ Can be shown as: ordered pairs, tables, graphs
DOMAIN	The set of x-values within a relation.
RANGE	The set of y-values within a relation.

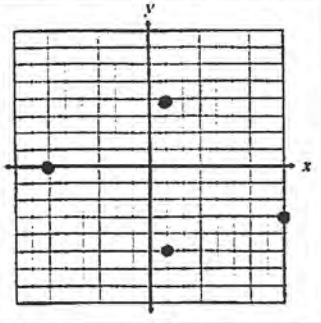
examples

1

ORDERED PAIRS	TABLE	GRAPH
{(5, 2), (-7, 1), (0, 3), (4, -4)}	x | y 5 | 2 -7 | 1 0 | 3 4 | -4	

Domain: $\{-7, 0, 4, 5\}$ Range: $\{-4, 1, 2, 3\}$

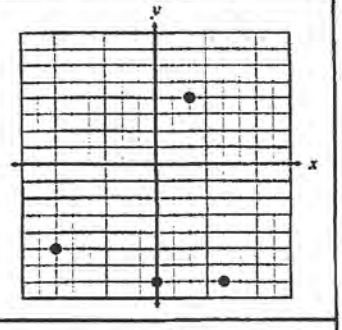
2

{(-6, 0), (1, 4), (8, -3), (1, -5)}	x | y -6 | 0 1 | 4 8 | -3 1 | -5	

Domain: $\{-6, 1, 8\}$ Range: $\{-5, -3, 0, 4\}$

For questions 3 and 4, use the points plotted on the graph.

3

$\{(-6,-5), (0,-7), (2,4), (4,-7)\}$	x | y -6 | -5 0 | -7 2 | 4 4 | -7	

Domain: $\{-6, 0, 2, 4\}$ Range: $\{-7, -5, 4\}$

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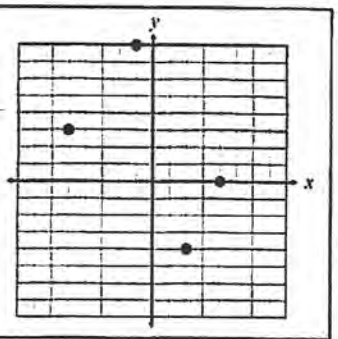
4

{(-5,3), (-1,8), (2,-4), (4,0)}

x	y
-5	3
-1	8
2	-4
4	0



Domain: {-5, -1, 2, 4}

Range: {-4, 0, 3, 8}

FUNCTION

A relation is a function if each x-value is paired with one + only one y-value.

examples

Directions: Determine whether each relation is a function.

5 {(6, -2), (-4, -1), (2, 0), (-7, 4)} — yes

6 {(1, 5), (-5, -3), (-8, -1), (1, -7)} — no

7 {(1, 4), (2, 4), (3, 4), (4, 4)} — yes

8 {(-7, 4), (-4, 1), (-4, -9), (0, -6)} — no

9

x	y
-2	4
-1	1
0	0
1	1
2	4

yes

10

x	y
-7	0
-4	1
-1	2
5	3
8	4

yes

11

x	y
-3	-2
-3	-1
-3	0
-3	5
-3	9

no

VERTICAL LINE TEST

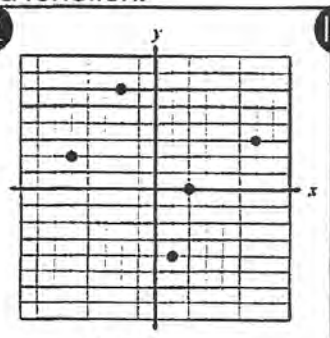
When given the **graph** of a relation, the vertical line test can be used to determine whether the relation is a function.

Vertical Line Test: If any vertical line passes through the graph of a relation no more than once, then its a function.

examples

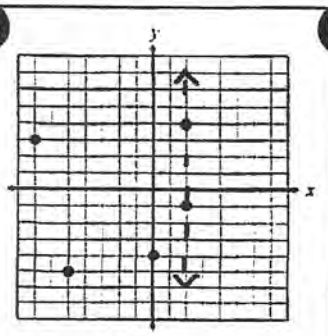
Directions: Use the vertical line test to determine whether each relation is a function.

12



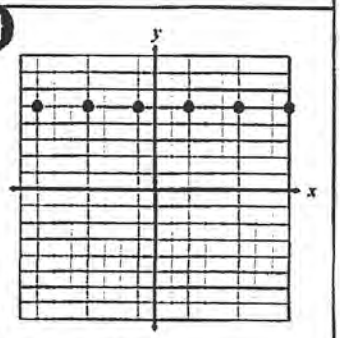
yes

13



no

14



yes

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Incoming Algebra 1 Summer Math Name_____ ID: 1

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Week 8 - Integer and Fraction Operations

4-5 problems/Day

Date_____ Period____

Simplify each. Write your answer as a mixed number when possible.

1) $\frac{12}{30}$

2) $\frac{8}{40}$

3) $\frac{6}{12}$

Evaluate each expression.

4) $2\frac{1}{8} - \left(-3\frac{3}{4}\right)$

5) $4\frac{2}{3} - \frac{13}{7}$

6) $3\frac{3}{8} + \left(-\frac{5}{3}\right)$

7) $2 - \left(-3\frac{4}{7}\right)$

Find each product.

8) $\left(3\frac{7}{9}\right)\left(-\frac{9}{5}\right)$

9) $\left(-\frac{2}{3}\right)\left(\frac{6}{5}\right)$

10) $\left(-\frac{4}{5}\right)\left(-\frac{11}{6}\right)$

Find each quotient.

11) $\frac{9}{5} \div 1\frac{4}{7}$

12) $-1\frac{9}{10} \div \frac{7}{4}$

13) $\frac{3}{4} \div \frac{1}{10}$

Evaluate each expression.

14) $5 + (-1)$

15) $3 + (-6)$

16) $7 - 4$

17) $7 + 7 + (-1)$

18) $4 - (-8) + 3$

19) $2 - (-8) + 7$

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Week 8 - (cont.)

Find each product.

20) $(-8)(10)$

21) $(7)(-2)$

22) $(-10)(9)$

Find each quotient.

23) $2 \div -2$

24) $6 \div -1$

25) $36 \div 4$

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
PARTS OF A FRACTION	NUMERATOR → $\frac{7}{8}$ ← DENOMINATOR All numbers that can be written as fractions are called **rational numbers**.
SIMPLEST FORM	A fraction that cannot be simplified any further.
EXAMPLES	**Directions:** Write each fraction in simpest form.

1. $\frac{8}{20} = \frac{2}{5}$	**2.** $-\frac{6}{18} = -\frac{1}{3}$	**3.** $\frac{21}{27} = \frac{7}{9}$
4. $-\frac{24}{40} = -\frac{3}{5}$	**5.** $-\frac{12}{42} = -\frac{2}{7}$	**6.** $\frac{36}{45} = \frac{4}{5}$
7. $\frac{16}{56} = \frac{2}{7}$	**8.** $\frac{18}{3} = 6$	**9.** $-\frac{8}{28} = -\frac{2}{7}$

IMPROPER FORM	A fraction in which the numerator is larger than the denominator.
MIXED NUMBERS	A number and a proper fraction
EXAMPLES	**Directions:** Write each improper fraction as a mixed number.

10. $\frac{19}{6} = 3\frac{1}{6}$	**11.** $-\frac{26}{3} = -8\frac{2}{3}$	**12.** $\frac{17}{2} = 8\frac{1}{2}$
13. $\frac{21}{4} = 5\frac{1}{4}$	**14.** $\frac{7}{3} = 2\frac{1}{3}$	**15.** $-\frac{35}{8} = -4\frac{3}{8}$

Directions: Write each mixed number as an improper fraction.

16. $3\frac{1}{5} = \frac{16}{5}$	**17.** $7\frac{2}{3} = \frac{23}{3}$	**18.** $-1\frac{9}{10} = \frac{-19}{10}$
19. $-2\frac{11}{13} = \frac{-37}{13}$	**20.** $-4\frac{3}{7} = -\frac{31}{7}$	**21.** $10\frac{1}{8} = \frac{81}{8}$

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
Adding & Subtracting Fractions	①	Write all mixed numbers as improper fractions.
	②	Find a **common denominator** by identifying the least common denominator. **(LCD)**
	③	Rewrite the fractions using the LCD as the denominator. Adjust each numerator to reflect the change in denominator.
	④	Add/Subtract the numberators and keep the common denominator.
	⑤	Simplify (if needed).

Examples

1. $\frac{1}{10}+\frac{3}{10} = \frac{4}{10}$

$= \boxed{\frac{2}{5}}$

2. $\frac{1}{4}+\frac{2}{3} = \frac{3}{12}+\frac{8}{12}$

$= \boxed{\frac{11}{12}}$

3. $\frac{3}{10}-\frac{11}{15} = \frac{9}{30}-\frac{22}{30}$

$= \boxed{\frac{-13}{30}}$

4. $-6-\frac{1}{4} = \frac{-24}{4}-\frac{1}{4}$

$= \boxed{\frac{-25}{4}}$ or $\boxed{-6\frac{1}{4}}$

5. $\frac{2}{9}-\left(-\frac{5}{18}\right) = \frac{4}{18}+\frac{5}{18}$

$= \frac{9}{18}$

$= \boxed{\frac{1}{2}}$

6. $\frac{5}{8}+\left(-\frac{1}{20}\right) = \frac{25}{40}-\frac{2}{40}$

$= \boxed{\frac{23}{40}}$

7. $-2\frac{3}{8}-1\frac{3}{4} = \frac{-19}{8}-\frac{7}{4}$

$= \frac{-19}{8}-\frac{14}{8}$

$= \boxed{\frac{-33}{8}}$ or $\boxed{-4\frac{1}{8}}$

8. $1\frac{5}{6}+2\frac{3}{4} = \frac{11}{6}+\frac{11}{4}$

$= \frac{22}{12}+\frac{33}{12}$

$= \boxed{\frac{55}{12}}$ or $\boxed{4\frac{7}{12}}$

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9. $2\frac{4}{5} - \left(-2\frac{1}{4}\right)$

$= \frac{14}{5} + \frac{9}{4}$

$= \frac{56}{20} + \frac{45}{20} = \boxed{\frac{101}{20}}$ or $\boxed{5\frac{1}{20}}$

10. $1\frac{7}{16} - 1\frac{1}{6}$

$= \frac{23}{16} - \frac{7}{6}$

$= \frac{69}{48} - \frac{56}{48} = \boxed{\frac{13}{48}}$

11. $-\frac{5}{6} + 1\frac{2}{9}$

$= \frac{-5}{6} + \frac{11}{9}$

$= -\frac{30}{36} + \frac{44}{36}$

$= \frac{14}{36} = \boxed{\frac{7}{18}}$

12. $-3\frac{1}{4} + \left(-\frac{1}{2}\right)$

$= \frac{-13}{4} - \frac{1}{2}$

$= \frac{-13}{4} - \frac{2}{4}$

$= \boxed{\frac{-15}{4}}$ or $\boxed{-3\frac{3}{4}}$

Applications

13. The length of a board is $2\frac{5}{8}$ feet long. If $\frac{5}{6}$ of a foot is trimmed off, find the new length.

$2\frac{5}{8} - \frac{5}{6} = \frac{21}{8} - \frac{5}{6}$

$= \frac{63}{24} - \frac{20}{24} = \boxed{\frac{43}{24}\text{ ft}}$ or $\boxed{1\frac{19}{24}\text{ ft}}$

14. During a recent two-day snowstorm, it snowed $6\frac{1}{8}$ inches on the first day and $8\frac{5}{12}$ inches on the second day. Find the total snowfall.

$6\frac{1}{8} + 8\frac{5}{12} = \frac{49}{8} + \frac{101}{12}$

$= \frac{147}{24} + \frac{202}{24} = \boxed{\frac{349}{24}\text{ in}}$ or $\boxed{14\frac{13}{24}\text{ in}}$

15. Natalie is baking a cake and cookies for her daughter's class party. She needs $1\frac{2}{3}$ cups of milk for the cake and $\frac{1}{2}$ cup for the cookies. If she has 3 cups of milk total, how much will she have left?

$1\frac{2}{3} + \frac{1}{2}$

$= \frac{5}{3} + \frac{1}{2} = \frac{10}{6} + \frac{3}{6} = \frac{13}{6}$

$3 - \frac{13}{6}$

$= \frac{18}{6} - \frac{13}{6} = \boxed{\frac{5}{6}\text{ cup}}$

Summary: _____

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Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
Multiplying Fractions	①	Write all mixed numbers as improper fractions.
	②	Simplify up and down and along the diagonals (if possible).
	③	Multiply the numerators to get the new numerator. Multiply the denominators to get the new denominator.
	④	Simplify (if needed).

Examples

1. $\frac{1}{2} \times \frac{4}{5} = \frac{1}{1} \times \frac{2}{5}$

$= \boxed{\frac{2}{5}}$

2. $\frac{1}{9} \times \frac{3}{5} = \frac{1}{3} \times \frac{1}{5}$

$= \boxed{\frac{1}{15}}$

3. $\frac{1}{7} \cdot -\frac{1}{5} = \boxed{-\frac{1}{35}}$

4. $2\frac{1}{5} \cdot 1\frac{2}{3} = \frac{11}{5} \cdot \frac{5}{3}$

$= \frac{11}{1} \cdot \frac{1}{3}$

$= \boxed{\frac{11}{3}}$ or $\boxed{3\frac{2}{3}}$

5. $-1\frac{1}{3} \cdot \frac{1}{2} = \frac{-4}{3} \cdot \frac{1}{2}$

$= \frac{-2}{3} \cdot \frac{1}{1}$

$= \boxed{\frac{-2}{3}}$

6. $-\frac{2}{3} \cdot -2\frac{4}{5} = -\frac{2}{3} \cdot -\frac{14}{5}$

$= \boxed{\frac{28}{15}}$ or $\boxed{1\frac{13}{15}}$

Dividing Fractions	①	Write all mixed numbers as improper fractions.
	②	Change to multiplication and FLIP the second fraction to its reciprocal (KISS!)
	③	Multiply the numerators to get the new numerator. Multiply the denominators to get the new denominator.
	④	Simplify (if needed).

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Examples

7. $\frac{1}{6} \div \frac{1}{5} = \frac{1}{6} \cdot \frac{5}{1}$

$= \boxed{\frac{5}{6}}$

8. $\frac{3}{4} \div -\frac{1}{2} = \frac{3}{4} \cdot -\frac{2}{1}$

$= \frac{3}{2} \cdot \frac{-1}{1}$

$= \boxed{\frac{-3}{2}}$ or $\boxed{-1\frac{1}{2}}$

9. $-\frac{4}{7} \div -\frac{8}{9} = -\frac{4}{7} \cdot -\frac{9}{8}$

$= -\frac{1}{7} \cdot \frac{-9}{2}$

$= \boxed{\frac{9}{14}}$

10. $2\frac{1}{10} \div -2\frac{4}{5} = \frac{21}{10} \div -\frac{14}{5}$

$= \frac{21}{10} \cdot -\frac{5}{14}$

$= \frac{3}{2} \cdot -\frac{1}{2} = \boxed{-\frac{3}{4}}$

11. $-4\frac{2}{7} \div 1\frac{1}{3} = -\frac{30}{7} \div \frac{4}{3}$

$= -\frac{30}{7} \cdot \frac{3}{4}$

$= -\frac{15}{7} \cdot \frac{3}{2}$

$= \boxed{\frac{-45}{14}}$ or $\boxed{-3\frac{3}{14}}$

12. $2\frac{3}{4} \div 5 = \frac{11}{4} \div 5$

$= \frac{11}{4} \cdot \frac{1}{5}$

$= \boxed{\frac{11}{20}}$

Applications

13. The Statue of Liberty is 305 feet tall. A nearby building is $\frac{4}{9}$ as tall. Find the height of the building.

$305 \cdot \frac{4}{9} = \frac{1220}{9}$ or $\boxed{135\frac{5}{9} \text{ ft}}$

14. Sarah has $27\frac{3}{4}$ feet of wire to make bead necklaces. If each necklace requires $1\frac{2}{3}$ feet of wire, how many necklaces can she make?

$27\frac{3}{4} \div 1\frac{2}{3} = \frac{111}{4} \div \frac{5}{3} = \frac{111}{4} \cdot \frac{3}{5} = \frac{333}{20}$

$\boxed{16 \text{ necklaces}}$ or $16\frac{13}{20}$

Summary: _____

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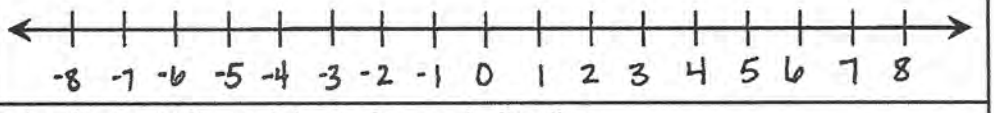
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
What are Integers?	Whole numbers (0, 1, 2, 3, ...) and their opposites
The Number Line	

Writing Integers

Directions: Write an integer for each situation.

1. a 3-yard gain	3	**2.** 8 degrees below normal	-8
3. a $75 deposit	75	**4.** a 21-pound loss	-21
5. 5 miles above sea level	5	**6.** a $40 deduction	-40
7. 2 strokes under par	-2	**8.** a $15 surcharge	15

Comparing & Ordering Integers

Directions: Place a < or > in the circle to complete each statement.

9. -12 (<) 5	**10.** -7 (>) -23	**11.** 1 (>) -6	**12.** -18 (<) -15
13. 20 (>) -25	**14.** -13 (<) 0	**15.** -36 (>) -40	**16.** -29 (<) -28

Directions: Order each set of integers from least to greatest.

17. {4, 0, -9, 2, -5, -1, 13}	-9, -5, -1, 0, 2, 4, 13
18. {-27, 21, -24, 16, -11, -8}	-27, -24, -11, -8, 16, 21
19. {12, -4, 9, -10, -18, 15}	-18, -10, -4, 9, 12, 15
20. {-52, -65, 37, -33, 48, -31}	-65, -52, -33, -31, 37, 48

Absolute Value

The distance from zero on a number line.

Notation: $|x|$ ← **Read as:** "The absolute value of x."

Directions: Evaluate each expression.

21. $\|7\|$ 7	**22.** $\|-20\|$ 20	**23.** $\|-4\|$ 4
24. $\|18\|$ 18	**25.** $\|35\|$ 35	**26.** $\|-11\|$ 11

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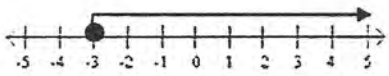
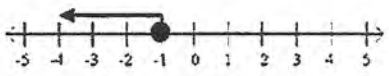
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Adding Integers	• To **ADD** means to move RIGHT on the number line! **Visual Example:** -3 + 8 = 5  **More Examples:** 1. 1 + 8 = 9 2. -11 + 9 = -2 3. -2 + 6 = 4 4. -7 + 7 = 0 5. -21 + 3 = -18 6. -9 + 13 = 4
Subtracting Integers	• To **SUBTRACT** means to move LEFT on the number line! **Visual Example:** -1 – 3 = -4  **More Examples:** 7. 9 – 4 = 5 8. -2 – 5 = -7 9. 4 – 6 = -2 10. -3 – 3 = -6 11. -28 – 8 = -36 12. -5 – 11 = -16
Watch out for Double Signs!	Rewrite "+(-)" as SUBTRACTION. Rewrite "-(-)" as ADDITION. **Examples:** 13. 2 + (-6) = 2-6 = -4 14. -7 + (-1) = -7-1 = -8 15. -20 + (-5) = -25 16. 18 + (-2) = 16 17. -15 + (-14) = -29 18. 1 + (-7) = -6 19. 9 – (-2) = 9+2 = 11 20. -12 – (-3) = -12+3 = -9 21. 0 – (-10) = 10 22. -6 – (-19) = 13 23. -2 – (-23) = 21 24. 21 – (-7) = 28

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Absolute Value Examples

25. $|-13|+|15| = 13+15 = 28$

26. $|23+15| = |38| = 38$

27. $|21-8| = 13$

28. $|24|-|-17| = 7$

29. $|-3|+|-5| = 8$

30. $|-11|-|-6| = 5$

31. $|-7-16| = 23$

32. $|4|-|-4| = 0$

33. $|-14-(-1)| = 13$

34. $|5-(-8)| = = 13$

Rules for Multiplying & Dividing Integers

Multiply or divide as you normally would, but use the following rules for the final sign:

- Two Positives (+ and +) make a **+**.
- Two Negatives (– and –) make a **+**.
- A Positive and a Negative (+ and –) make a **–**.

Multiplying Integers

35. $-9 \times -3 = 27$

36. $-4 \times -11 = 44$

37. $8(-9) = -72$

38. $-6(10) = -60$

39. $-4(-7) = 28$

40. $6(8) = 48$

41. $11 \cdot -2 = -22$

42. $-8 \cdot -3 = 24$

43. $-5 \cdot 9 = -45$

44. $16 \cdot -2 = -32$

Dividing Integers

45. $63 \div 7 = 9$

46. $-18 \div -9 = 2$

47. $-9 \div -3 = 3$

48. $-20 \div 2 = -10$

49. $90/10 = 9$

50. $56/-8 = -7$

51. $-8/8 = -1$

52. $-21/-3 = 7$

53. $-42/7 = -6$

54. $12/-1 = -12$

Summary: _____

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