Section 3:

Operations & Algebraic Thinking

Words to Know: Expression, Equation, Formula, Variable, Sequence, Independent Variable, Dependent Variable, Slope, Function, Ratio, Rate, Proportion

Evaluating Expressions (A)

Evaluate each expression using the value given.

1. $c - c$
   $(c = 6)$

2. $6y$
   $(y = 9)$

3. $c \cdot c$
   $(c = 4)$

4. $9 \div a$
   $(a = 2)$

5. $v \cdot v$
   $(v = 2)$

6. $a - 2$
   $(a = 7)$

7. $8z$
   $(z = 6)$

8. $2v$
   $(v = 7)$

9. $5u$
   $(u = 4)$

10. $5b$
    $(b = 3)$

11. $6 - c$
    $(c = 5)$

12. $c - c$
    $(c = 7)$

13. $8 \div u$
    $(u = 2)$

14. $b + 5$
    $(b = 2)$

15. $b - b$
    $(b = 2)$

Name_____

Order of Operations

Date_____ Period_____

Evaluate each expression.

1) $3(6+7)$

2) $5 \times 3 \times 2$

3) $72 \div 9 + 7$

4) $2 + 7 \times 5$

5) $9 + 8 - 7$

6) $9 - 32 \div 4$

7) $5(10-1)$

8) $48 \div (4+4)$

9) $20 \div (4 - (10-8))$

10) $40 \div 4 - (5-3)$

11) $9 + 9 + 6 - 5$

12) $(5+16) \div 7 - 2$

13) $7 + 10 \times 5 + 10$

14) $(6 + 25 - 7) \div 6$

15) $(6-4) \times 49 \div 7$

16) $(7 \times 5) \div 5$

17) $\dfrac{43-1}{4+2} + 10$

18) $(8+5) \times \dfrac{35}{5} + 6$

19) $\dfrac{27}{2+3+4} + 3$

20) $\dfrac{45}{8(5-4)-3}$

21) $8 \times \dfrac{15}{5} - (5+9)$

22) $2 \times 7 - \dfrac{10}{9-4}$

23) $(10+2-2) \times 6 - 1$

24) $\dfrac{49}{7} \times \dfrac{60}{2 \times 5}$

25) $(2+6 \times 2 + 2 - 4) \times 2$

26) $\dfrac{8}{5-1} \times (3+6) \times 3$

Simple Linear Equations (A)

Solve for each variable.

1. $\dfrac{a}{8} = -4$

2. $b - (-5) = 13$

3. $3 + \dfrac{18}{z} = 12$

4. $-9 + \dfrac{36}{a} = -5$

5. $u + 2 = -8$

6. $2z = 2$

7. $-1 - \dfrac{y}{8} = -7$

8. $\dfrac{8}{u} - (-2) = 6$

9. $a - 2 = -10$

10. $\dfrac{u}{6} = 3$

11. $10 - \dfrac{b}{2} = 3$

12. $\dfrac{y}{-7} = -7$

13. $\dfrac{b}{7} = -5$

14. $\dfrac{-2}{c} = 2$

15. $\dfrac{c}{5} + 3 = 8$

Word Problems

1) The sum of three consecutive numbers is 114.
What is the smallest of the three numbers ?   _____

2) Mike bought 8 new baseball trading cards to add to his collection. The next
day his dog ate half of his collection. There are now only 40 cards left.
How many cards did Mike start with ?   _____

3) Fred sold half of his comic books and then bought 7 more. He now has
13. How many did he begin with ?   _____

4) The sum of three consecutive even numbers is 90.
What is the smallest of the three numbers ?   _____

5) Nancy spent half of her allowance going to the movies. She washed the family
car and earned 6 dollars. What is her weekly allowance if she ended with
14 dollars ?   _____

6) Keith had 110 dollars to spend on 8 books. After
buying them he had 14 dollars. How much did each book cost ?   _____

7) Oceanside Bike Rental Shop charges a 18 dollar fixed fee plus 8 dollars an
hour for renting a bike. Dan paid 50 dollars to rent a bike. How many
hours did he pay to have the bike checked out ?   _____

8) On Monday, 284 students went on a trip to the zoo. All 6
buses were filled and 8 students had to travel in cars. How many students were
in each bus ?   _____

9) Sandy bought a soft drink for 4 dollars and 5 candy bars. She spent
a total of 24 dollars. How much did each candy bar cost ?   _____

10) The sum of three consecutive odd numbers is 69.
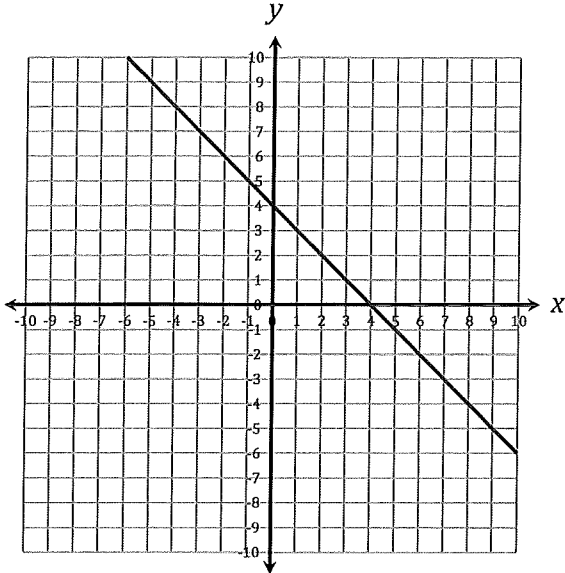What is the smallest of the three numbers ?   _____
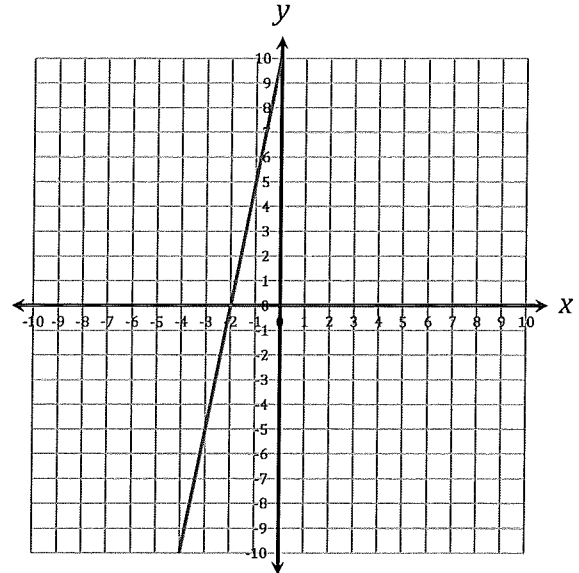
Linear Equation Graphs (A)
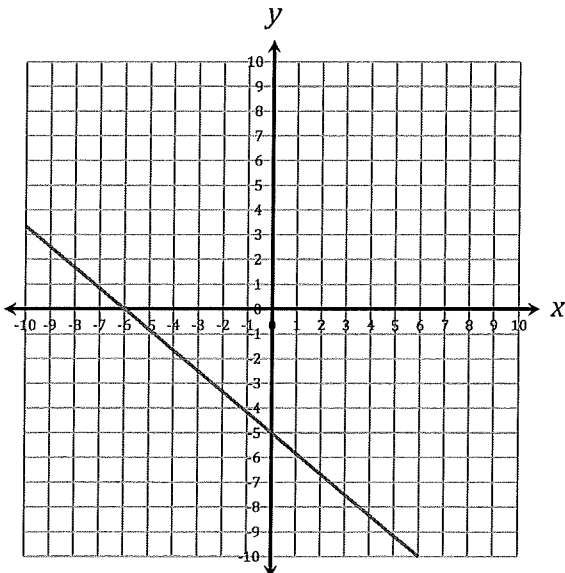
Name: _____

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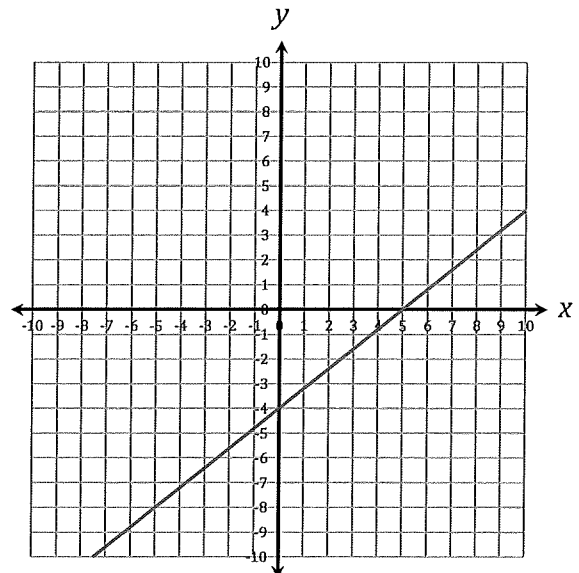Determine the equation, y-intercept, x-intercept and slope of each line from its graph.

Equation:
y-intercept:
x-intercept:
Slope:
___

Equation:
y-intercept:
x-intercept:
Slope:
___

Equation:
y-intercept:
x-intercept:
Slope:
___

Equation:
y-intercept:
x-intercept:
Slope:
___

Number Patterns (A)

Instructions: Write the next three terms in the patterns below.

51, 44, 37, 30, _____, _____, _____.   54, 51, 48, 45, _____, _____, _____.

52, 48, 44, 40, _____, _____, _____.   63, 58, 53, 48, _____, _____, _____.

7, 9, 11, 13, _____, _____, _____.   12, 20, 28, 36, _____, _____, _____.

4, 10, 16, 22, _____, _____, _____.   13, 16, 19, 22, _____, _____, _____.

10, 18, 26, 34, _____, _____, _____.   23, 29, 35, 41, _____, _____, _____.

72, 66, 60, 54, _____, _____, _____.   58, 51, 44, 37, _____, _____, _____.

8, 16, 24, 32, _____, _____, _____.   22, 30, 38, 46, _____, _____, _____.

17, 22, 27, 32, _____, _____, _____.   3, 4, 5, 6, _____, _____, _____.

68, 64, 60, 56, _____, _____, _____.   70, 69, 68, 67, _____, _____, _____.

53, 52, 51, 50, _____, _____, _____.   71, 65, 59, 53, _____, _____, _____.

62, 60, 58, 56, _____, _____, _____.   18, 21, 24, 27, _____, _____, _____.

60, 53, 46, 39, _____, _____, _____.   21, 26, 31, 36, _____, _____, _____.

66, 64, 62, 60, _____, _____, _____.   65, 60, 55, 50, _____, _____, _____.

24, 31, 38, 45, _____, _____, _____.   16, 20, 24, 28, _____, _____, _____.

73, 72, 71, 70, _____, _____, _____.   69, 67, 65, 63, _____, _____, _____.

Equivalent Ratios

Write two equivalent ratios.

1) | 5 | | |
    | 3 | | |

2) | 10 | | |
    | 7 | | |

3) | 11 | | |
    | 7 | | |

4) | 8 | | |
    | 3 | | |

5) | 6 | | |
    | 7 | | |

6) | 6 | | |
    | 5 | | |

Determine whether the ratios are equivalent.

7) $\frac{5}{8}$ and $\frac{25}{40}$ _____

8) $\frac{11}{3}$ and $\frac{7}{2}$ _____

9) $\frac{11}{4}$ and $\frac{66}{24}$ _____

10) $\frac{12}{7}$ and $\frac{3}{7}$ _____

11) $\frac{4}{11}$ and $\frac{20}{55}$ _____

12) $\frac{9}{11}$ and $\frac{9}{7}$ _____

Use equivalent ratios to find the unknown value.

13) $\frac{5}{4} = \frac{20}{k}$ k = _____

14) $\frac{b}{40} = \frac{11}{8}$ b = _____

15) $\frac{9}{v} = \frac{3}{5}$ v = _____

16) $\frac{9}{10} = \frac{d}{70}$ d = _____

17) $\frac{b}{10} = \frac{9}{5}$ b = _____

18) $\frac{8}{5} = \frac{d}{15}$ d = _____

Equivalent Ratios (A)

Fill in the blanks to make equivalent ratios.

1. $10 : 9 = \underline{\quad} : 27$

2. $6 : 5 = 30 : \underline{\quad}$

3. $4 : 7 = \underline{\quad} : 14$

4. $1 : 3 = \underline{\quad} : 12$

5. $7 : 2 = \underline{\quad} : 4$

6. $1 : 2 = \underline{\quad} : 8$

7. $1 : 9 = 3 : \underline{\quad}$

8. $5 : 2 = 25 : \underline{\quad}$

9. $1 : 4 = 4 : \underline{\quad}$

10. $3 : 7 = 15 : \underline{\quad}$

11. $11 : 7 = 22 : \underline{\quad}$

12. $10 : 3 = \underline{\quad} : 6$

13. $9 : 2 = \underline{\quad} : 4$

14. $7 : 1 = 21 : \underline{\quad}$

15. $8 : 3 = 32 : \underline{\quad}$

16. $5 : 11 = 20 : \underline{\quad}$

17. $12 : 1 = \underline{\quad} : 4$

18. $1 : 6 = \underline{\quad} : 30$

19. $9 : 4 = 36 : \underline{\quad}$

20. $3 : 5 = \underline{\quad} : 20$

Are They Equivalent? (A)

Check mark the equations that show equivalent fractions.

$\dfrac{7}{8} = \dfrac{91}{88}$ $\dfrac{6}{6} = \dfrac{84}{84}$ $\dfrac{4}{10} = \dfrac{60}{150}$ $\dfrac{1}{3} = \dfrac{7}{21}$

$\dfrac{4}{4} = \dfrac{48}{40}$ $\dfrac{2}{8} = \dfrac{16}{64}$ $\dfrac{4}{9} = \dfrac{48}{72}$ $\dfrac{6}{12} = \dfrac{66}{132}$

$\dfrac{1}{4} = \dfrac{12}{48}$ $\dfrac{3}{3} = \dfrac{45}{45}$ $\dfrac{5}{11} = \dfrac{70}{154}$ $\dfrac{9}{9} = \dfrac{54}{81}$

$\dfrac{3}{4} = \dfrac{21}{28}$ $\dfrac{7}{7} = \dfrac{84}{84}$ $\dfrac{2}{3} = \dfrac{20}{27}$ $\dfrac{1}{9} = \dfrac{7}{126}$

$\dfrac{8}{11} = \dfrac{48}{99}$ $\dfrac{1}{3} = \dfrac{12}{33}$ $\dfrac{4}{7} = \dfrac{44}{35}$ $\dfrac{10}{11} = \dfrac{140}{154}$

$\dfrac{6}{11} = \dfrac{30}{55}$ $\dfrac{11}{11} = \dfrac{77}{143}$ $\dfrac{1}{10} = \dfrac{8}{80}$ $\dfrac{4}{12} = \dfrac{48}{108}$

$\dfrac{6}{7} = \dfrac{90}{70}$ $\dfrac{1}{2} = \dfrac{12}{18}$ $\dfrac{2}{10} = \dfrac{16}{80}$ $\dfrac{7}{9} = \dfrac{105}{135}$

$\dfrac{8}{8} = \dfrac{56}{40}$ $\dfrac{7}{8} = \dfrac{42}{48}$ $\dfrac{4}{8} = \dfrac{56}{120}$ $\dfrac{7}{8} = \dfrac{91}{120}$

$\dfrac{3}{3} = \dfrac{21}{27}$ $\dfrac{11}{12} = \dfrac{165}{120}$ $\dfrac{7}{7} = \dfrac{98}{98}$ $\dfrac{4}{10} = \dfrac{24}{90}$

Ratios and Rates

Express each phrase as a rate and unit rate.   Rate   Unit Rate
(Round your answer to the nearest hundredth.)

1) 8 dollars for 4 cans of tuna   _____   _____

2) mowed 6 yards for $30.00   _____   _____

3) 4 inches of snow in 7 hours   _____   _____

4) 14 chocolate bars cost 16 dollars   _____   _____

5) 115 miles on 9 gallons of gas   _____   _____

6) 7 pencils for 16 dollars   _____   _____

7) 7 movie tickets cost $45.00   _____   _____

8) 19 dollars for 9 books   _____   _____

9) 4 calculators cost $120.00   _____   _____

10) 8 batteries cost 20 dollars   _____   _____

Word Problems

1) A ferris wheel can accommodate 45 people in 30 minutes. How many people
   could ride the ferris wheel in 4 hours? What was that rate per hour?   _____

2) A jet travels 560 miles in 5 hours. At this rate, how far could the jet fly in
   13 hours? What is the rate of speed of the jet?   _____

3) You can buy 3 apples at the Quick Market for $1.26. You can buy 5 of the
   same apples at Stop and Save for $1.15. Which place is the better buy?   _____

4) You can buy 5 cans for green beans at the Village Market for $2.50. You can buy 10
   of the same cans of beans at Sam's Club for $6.90. Which place is the better buy?   _____

5) An ice cream factory makes 310 quarts of ice cream in 5 hours. How many
   quarts could be made in 48 hours? What was that rate per day?   _____

6) Gas mileage is the number of miles you can drive on a a gallon of gasoline.
   A test of a new car results in 490 miles on 10 gallons of gas. How far could
   you drive on 60 gallons of gas? What is the car's gas mileage?   _____

7) The bakers at Healthy Bakery can make 170 bagels in 5 hours. How many
   bagels can they bake in 16 hours? What was that rate per hour?   _____

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