Grade 8

Expressions & Equations Worksheets

Expressions & Equations – 8.EE.1

Simplify

1. $x^3 \cdot x^2$
2. $y^3 \cdot y^7$
3. $b^4 \cdot b^{12}$

4. $c^3 c^5 c^2$

7. $(m^3)^5$

10. $(b^7)^0$

Find the missing exponent

Expressions & Equations – 8.EE.2

Evaluate the following expressions:

1. $\sqrt{64} =$ 9. $\sqrt{144} + 7 =$

2. $9^2 =$ 10. $\sqrt{16} + 4^2 =$

3. $\sqrt[3]{125} =$ 11. $\sqrt[3]{27} + \sqrt{16} =$

Expressions & Equations – 8.EE.3

1) Which of the following has a value greater than 200 but less than 2,000
   A. 2.5×10^5 C. 7.2×10^4
   B. 3.2×10^2 D. 2.8×10^1

2) Which of the following has a value greater than 500 but less than 1,000
   A. 5.1×10^2 C. 9
   B. 3.8×10^2 D. 5

3) Which of the following has a value greater
   A. 7.4×10^5 C. 3
   B. 6.2×10^1 D. 8

4) In 2016, the population of the United
   3.24×10^8. It is expected that the population
   2050. Which shows the growth population
   A. 7.4×10^{-1} C. 7
   B. 7.4×10^7 D. 7

5) A small town in Kansas started with a
   years ago. Now, the town has experienced
   population of about 3,234,956 people. A
   larger is the current population in the K.
   ago?

Expressions & Equations – 8.EE.4

Write each number in scientific notation

1. 27,001   2. 0.34156020

3. 0.0089   4. 134

5. 901,034   6. 0.000004

7. There are about 270000000000000 red blood cells in the human body

8. It is 380000000 meters from the Earth to the moon

9. Americans drink 145000000000 cups of coffee per year.

10. A fly weighs 0.0000000000431 times as much as an elephant.

11. What is 1.47×10^{-1}? Is this the same as 147 thousandths?

Expressions & Equations – 8.EE.5

Determine if the following graphs have a slope that is positive, negative, zero, or undefined.

1)   2)   3)   4)

Determine if the following statements are true

5) _____ A proportional relationship has a co

6) _____ A proportional relationship has a gr

Expressions & Equations – 8.EE.6

Write the equation in slope intercept form for the following graphs:

1) _____   2) _____   3) _____

6) _____

Expressions & Equations – 8.EE.7

Match the following examples to the correct special case
1. _____ $x = x$ A. No Solution
2. _____ $x = 5$ B. Infinite Solutions
3. _____ $x = y$ C. One Solution

Solve the following equations:
4. $2x + 3x + 8 = 5x + 8$

6. $4(3d + 2) = 22d - 2$

8. $10 + 3x - 12 = -2 + 3x$

10. $8(x - 3) + 15 = 55$

Expressions & Equations – 8.EE.8

Solve the following word problems. Be sure to label your variables and write a system of equations then solve.

1) Ms. Jones took her family and friends to the movies. There were a total of 12 people. Children tickets cost $5 and adult tickets cost $10. She spent a total of $95. How many children went to the movies?

2) The Roosevelt Middle School band is having a fundraiser. They sold a total of 300 hotdogs and hamburgers. Hotdogs sold for $2 and hamburgers sold for $3. They made a total of $780. How many individual hamburgers and hotdogs did they sell?

3) The basketball team scored 89 points in just two- and three-point baskets. The number of two-point baskets was 27 more than the number of three-point baskets. How many two-point and three-pointers did the team make?

4) For dinner, Jerry had a double cheeseburger and two medium fries totaling 1200 calories. Joe has two double cheeseburgers and one medium fry totaling 1260 calories. How many calories are in one double cheeseburger and one order of medium fries?

5) A farmhouse shelters 16 animals. Some of them are chickens and the others are cows. Altogether these animals have 60 legs. How many chickens and how many cows are in the farmhouse?

Name: _____   Date: _____   Hour: _____

Simplify

1. $x^5 \cdot x^2$

2. $y^3 \cdot y^7$

3. $b^4 \cdot b^{12}$

4. $c^3 c^5 c^2$

5. $a^3 a^1 a^8$

6. $(y^2)^4$

7. $(m^3)^5$

8. $(2x^4)^2$

9. $(3y^2)^3$

10. $(b^7)^0$

11. $(s^2)^6 \cdot s^5$

12. $t^x \cdot t^y$

Find the missing exponent in each expression.

13. $x^{} \cdot x^5 = x^7$

14. $b^{} \cdot b^3 = b^8$

15. $y^4 \cdot y^{} = y^{11}$

16. $m^4 \cdot m^{} = m^5$

Solve the following:

17. $(a^2 b)^4 \cdot (a^3 b^5)^2$

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.1

Simplify – Your answers must contain positive exponents

1. $x^7 \cdot x^{-2}$

2. $y^7 \cdot y^4 \cdot y$

3. $(b^4)^{-2}$

4. $\dfrac{5x^{-4}}{x^{-9}}$

5. $\dfrac{b^4}{b^6}$

6. $(y^{-2})^4$

7. $\dfrac{x^3 \cdot x^4}{x^2}$

8. $\dfrac{r^2 t^{-3}}{r^{-3} t^5}$

9. $2x^{-2}$

10. $(b^7 x^3)^0$

11. $(s^2 \cdot s^5)^{-4}$

12. $(x^{-2}y)^{-3}$

13. $\left(\dfrac{x^4 y^{-8}}{x^{-3} y^4}\right)^2$

14. $\dfrac{x^3 y}{xy^5} \cdot \dfrac{x^2 y^9}{x^8}$

Solve the following:

15. $(5x^7 y^3 z^{-1})^2 \cdot (2xy^{-5})^3 \cdot (2y^{-3} z^2)^3$

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.2

Evaluate the following expressions:

1. $\sqrt{64} =$

2. $9^2 =$

3. $\sqrt[3]{125} =$

4. $5^2 + 2^3 =$

5. $\sqrt{30 + 6} =$

6. $2^2 =$

7. $\sqrt[3]{27} + 2^3 =$

8. $5^2 + 5 =$

9. $\sqrt{144} + 7 =$

10. $\sqrt{16} + 4^2 =$

11. $\sqrt[3]{27} + \sqrt{16} =$

12. $\sqrt[3]{64} + 4^3 =$

13. $\sqrt{100} + 10 =$

14. $7^2 + 4^2 =$

15. $\sqrt[3]{27} + 3 =$

16. $\sqrt{4} + \sqrt{16} =$

Expressions & Equations – 8.EE.2

Solve each equation for the unknown variable. Round your answers to the nearest tenth if necessary.

1. $x^3 = 27$

2. $x^2 = 49$

3. $m^3 = 8$

4. $y^2 = 64$

5. $b^2 = 100$

6. $h^3 = 100$

7. $j^3 = 64$

8. $n^2 = 50$

9. $a^2 = 121$

10. $c^3 = 150$

11. $r^2 = 80$

12. $x^3 = 125$

13. $l^3 = 512$

14. $t^2 = 81$

15. $k^2 = 169$

16. $b^3 = 1000$

Expressions & Equations − 8.EE.3

1) Fill in the following table:

10^{-6}	10^{-5}	10^{-4}	10^{-3}	10^{-2}	10^{-1}	10^{0}	10^{1}	10^{2}	10^{3}	10^{4}	10^{5}	10^{6}

Estimate the following values by rewriting them as a single digit times a power of ten.

2) 2,479

3) 431,056

4) 2,943,450

5) 123,488

6) 9,765,344

7) 805,465,321

8) 0.000678

9) 0.345001

10) 0.000000002

11) 0.00000418

Expressions & Equations – 8.EE.3

1) Which of the following has a value greater than 200 but less than 2,000

    A. 2.5×10^3 C. 7.2×10^4

    B. 3.2×10^2 D. 2.8×10^1

2) Which of the following has a value greater than 500 but less than 1,000

    A. 5.1×10^2 C. 9.2×10^3

    B. 3.8×10^2 D. 5.8×10^1

3) Which of the following has a value greater than 450 but less than 890

    A. 7.4×10^3 C. 3.8×10^2

    B. 6.2×10^1 D. 8.8×10^2

4) In 2016, the population of the United States was approximately 3.24×10^8. It is expected that the population will be about 3.98×10^8 in 2050. Which shows the growth population, written in scientific notation?

    A. 7.4×10^{-1} C. 7.4×10^8

    B. 7.4×10^7 D. 7.4×10^{-2}

5) A small town in Kansas started with a population of 2,300 people 80 years ago. Now, the town has experienced significant growth and has a population of about 3,234,956 people. Approximately how many times larger is the current population in the Kansas town than it was 80 years ago?

Name: _____ Date: _____ Hour: _____

Expressions & Equations – 8.EE.4

Write each number in scientific notation

1. 27,001

2. 0.34156020

3. 0.0089

4. 134

5. 901,034

6. 0.000004

7. There are about 270000000000000 red blood cells in the human body.

8. It is 380000000 meters from the Earth to the moon

9. Americans drink 145000000000 cups of coffee per year.

10. A fly weighs 0.0000000000431 times as much as an elephant.

11. What is 1.47×10^{-1}? Is this the same as 147 thousandths?

Expressions & Equations – 8.EE.4

State whether the following is in scientific notation or not. If it is not explain why.

1. 12.345×10^2 _____

2. 3.42×10^{-5} _____

3. 2×10^4 _____

4. 0.321×10^3 _____

5. 3.21×10^0 _____

Solve the following:

6. $(2 \times 10^3) \times (4 \times 10^2)$ 7. $(3 \times 10^5) \times (5 \times 10^4)$

_____   _____

8. $(8 \times 10^6) \div (4 \times 10^3)$ 9. $(4 \times 10^2) \div (8 \times 10^7)$

_____   _____

10. $(9 \times 10^2) + (1 \times 10^4)$ 11. $(5 \times 10^5) + (2 \times 10^4)$

_____   _____

12. $(5 \times 10^3) - (8 \times 10^2)$ 13. $(7 \times 10^{10}) - (3.5 \times 10^8)$

_____   _____

Expressions & Equations – 8.EE.5

Determine if the following graphs have a slope that is positive, negative, zero, or undefined.

1)

_____

2)

_____

3)

_____

4)

_____
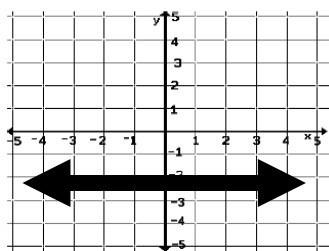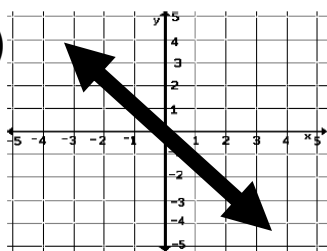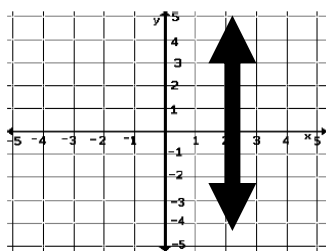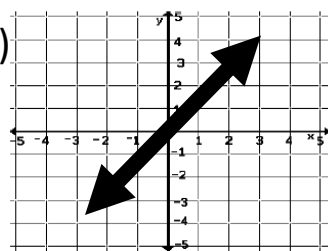
Determine if the following statements are true or false. If false make the statement true.

5) _____ A proportional relationship has a constant rate of change.

6) _____ A proportional relationship has a graph that is linear or non-linear.

7) _____ A proportional relationship always passes through the point (1, 1).

Find the slope or unit rate of the proportional relationships shown:

8)
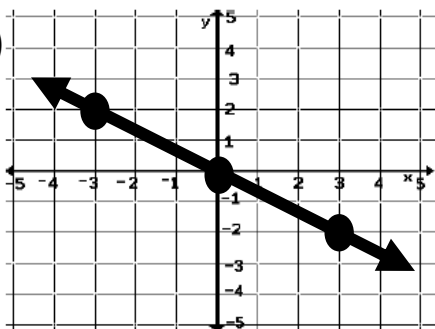
9)
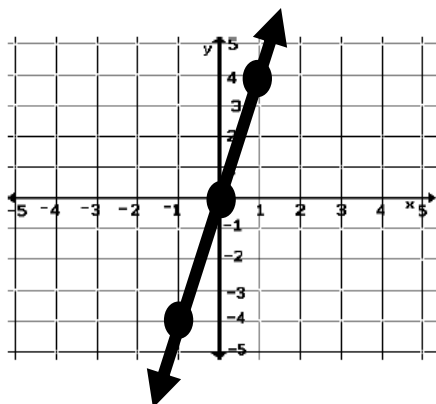
10)
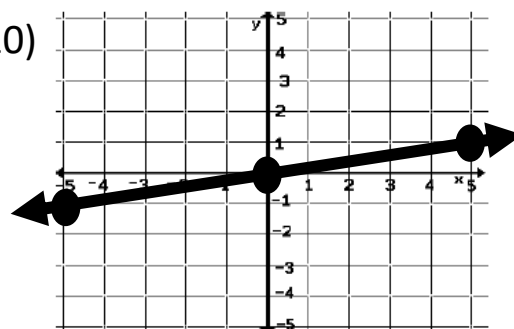
11) $y = 5x$

12) $2y = 10x$

13) $y = \frac{1}{4}x$

14)

Week	1	2	5	10
Amount	120	140	200	300

15)

Time (hours)	5	10	15	20
Distance (miles)	25	50	75	100

Expressions & Equations – 8.EE.5

1) Compare the following graph and table to determine which object is moving at a greater speed and explain your answer.
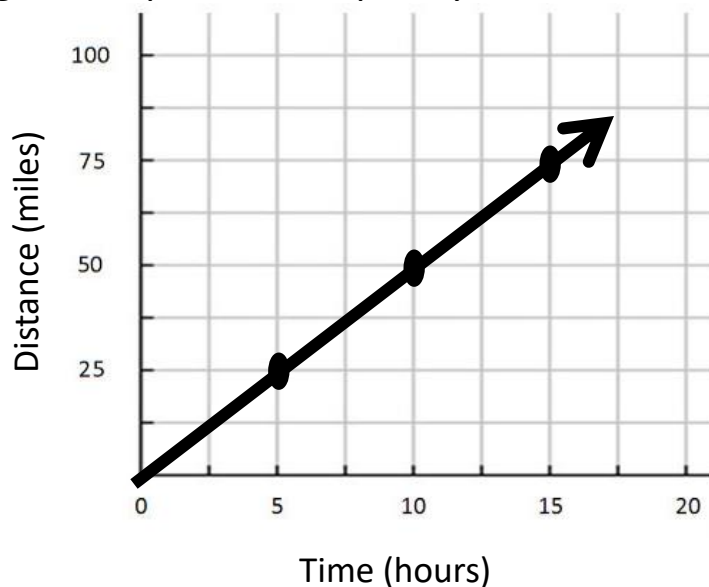
Time (hours)	4	8	12	16
Distance (miles)	15	30	45	60

_____

_____

_____

2) Compare the following equation and graph to determine which object is moving at a greater speed and explain your answer.

$$d = 15t$$

Where d = distance (miles)

and t = time (minutes)

_____

_____

_____
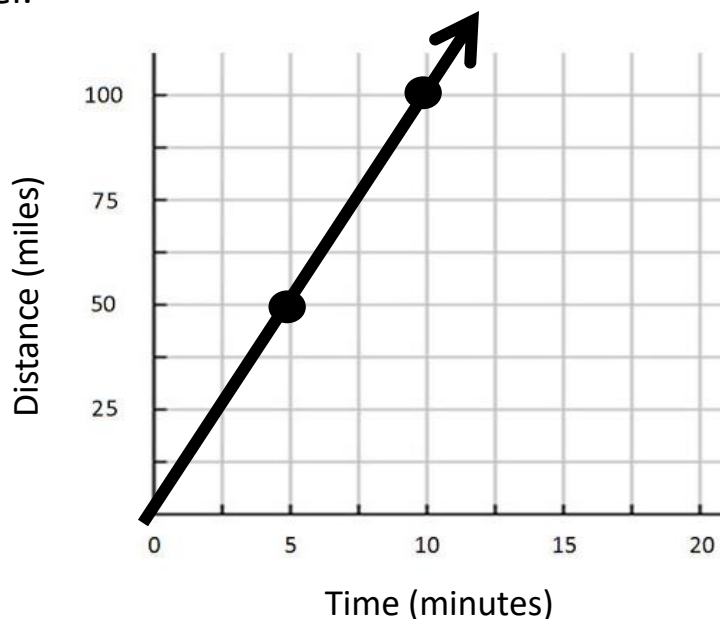
Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.6

1. What is slope intercept form of a linear equation? _____

Find the slope and y – intercept of each of the following lines:

2. $y = 4x - 6$

m =

b = (,   )

3. $y = -x - 4$

m =

b = (,   )

4. $y = 3x$

m =

b = (,   )

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

m =

b = (,   )

6. $y = 2x - 5$

m =

b = (,   )

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

m =

b = (,   )

Write an equation in slope intercept form for the following problems:

8. slope = 6 and y – intercept (0, -8)

9. slope = -1 and y – intercept (0, 2)

10. slope = $\frac{4}{5}$ and y – intercept (0, -1)

11. slope = -3 and y – intercept (0, 5)

12. slope = 2 and y – intercept (0, 3)

13. slope = $\frac{2}{3}$ and y – intercept (0, 0)

14. What is the slope formula? _____ where $(x_1, y_1)\ and\ (x_2, y_2)$

Find the slope of the line that passes through each pair of points.
Show all your work!

15. (8, 7) (3, 6)

16. (3, 2) (5, 4)

17. (-2, -2) (-4, 1

18. (3, 2) (3, -2)

19. (3, -6) (2, -4)

20. (0, 4) (4, 4)

Expressions & Equations – 8.EE.6

Write the equation in slope intercept form for the following graphs:
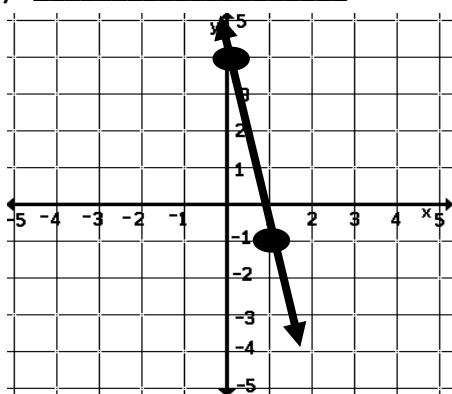
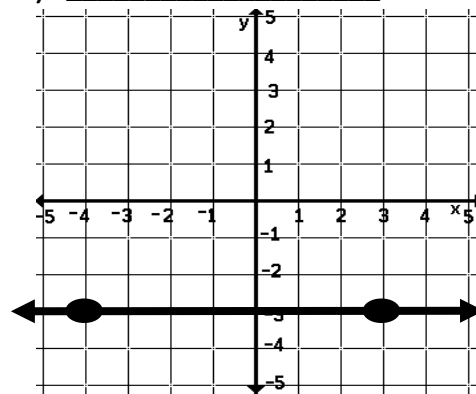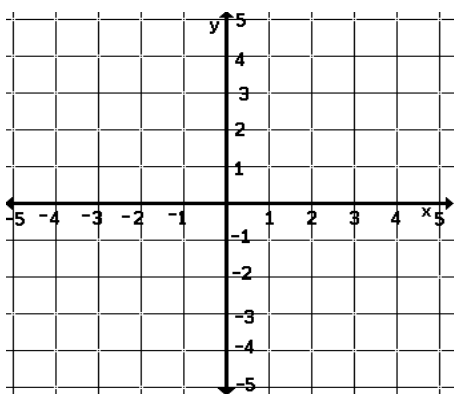1) _____
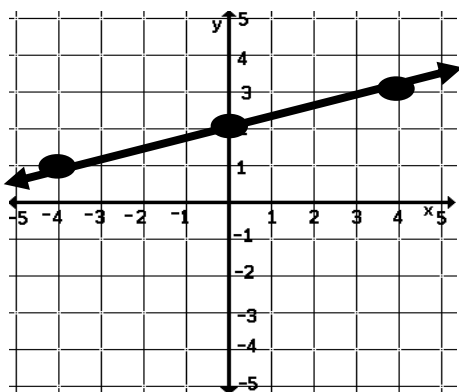
2) _____
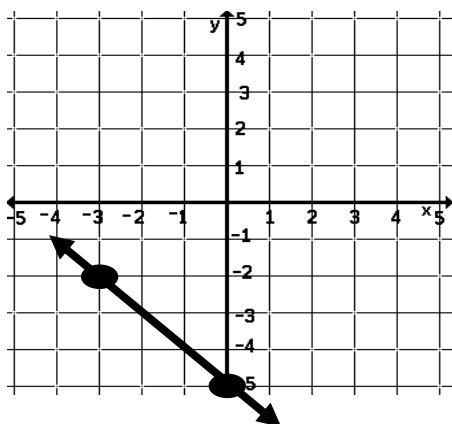
3) _____
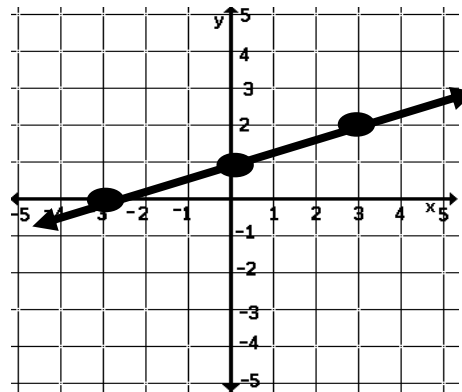
4) _____
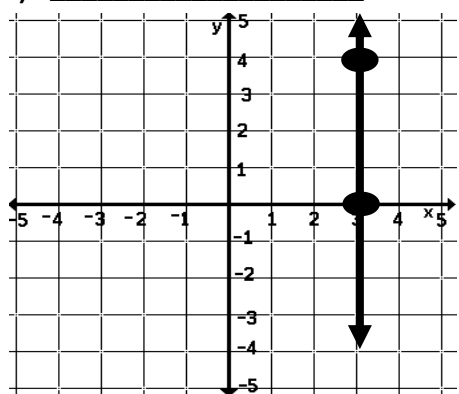
5) _____

6) _____
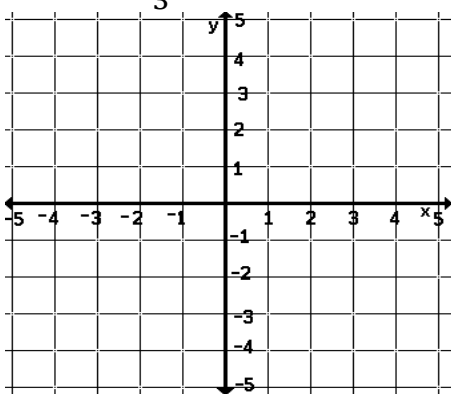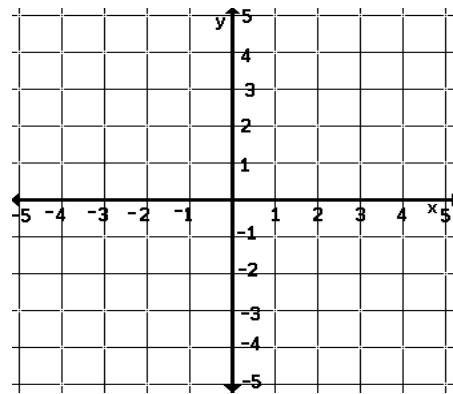

Graph the following equations:

7) $y = 2x + 3$

8) $y = -\dfrac{1}{3}x - 4$

9) $y = -x + 1$

Expressions & Equations – 8.EE.7

Solve the following:

1. $x - 12 + 5x = 24$

2. $4y + 6 - 2y = 14$

3. $2x - 8 + 3x = 7$

4. $5a - 1 + a = 11$

5. $-6(8x - 3) = 114$

6. $-3 = 4x + 6 - x$

7. $\frac{1}{2}b + \frac{3}{2}b + 7 = 21$

8. $3(2x - 7) + 4 = 13$

Match the following vocabulary words to the correct definition:

9. _____ Expression

10. _____ Terms

11. _____ Coefficient

12. _____ Like Terms

A.   Terms that have the same base, variable, and exponent
B.   The number in front of a variable
C.   A mathematical phrase that can contains numbers, variables and operators
D.   A constant or a variable in an expression

13. One students worked the equation below, and their work is shows. Work through the problems, and check to see if any mistakes were made. If so, state on which line the error was made and how it should be corrected.

<u>Equation #1</u>

Line 1: $9x + 2 + 3x - 7 = 15$

Line 2: $12x + 9 = 15$

Line 3: $12x = 24$

Line 4: $x = 2$

Expressions & Equations – 8.EE.7

Solve the following:

1. $7x - 11 = -19 + 3x$

2. $11a + 9 = 4a + 30$

3. $19c + 31 = 26c - 74$

4. $10a - 37 = 6a + 51$

5. $5w + 9.9 = 4.8 + 8w$

6. $15 - x = 2(x + 3)$

7. $4(3d - 2) = 88d - 5$

8. $15y + 14 = 2(5y + 6)$

9. $\frac{1}{2}(6x - 4) = 4x - 9$

10. $3(2x + 1) = 5(x - 4)$

11. $\frac{1}{4}(40 - 8x) = 19x + 2 - 5x$

12. $-5x + 12 - 7x = -3(5x + 8)$

Expressions & Equations – 8.EE.7

Match the following examples to the correct special case

1. _____ x = x   A. No Solution
2. _____ x = 5   B. Infinite Solutions
3. _____ x = y   C. One Solution

Solve the following equations:

4. $2x + 3x + 8 = 5x + 8$ 5. $-7x - 3x + 2 = -10x + 9$

6. $4(3d + 2) = 22d - 2$ 7. $9 + 8x = 8x - 9$

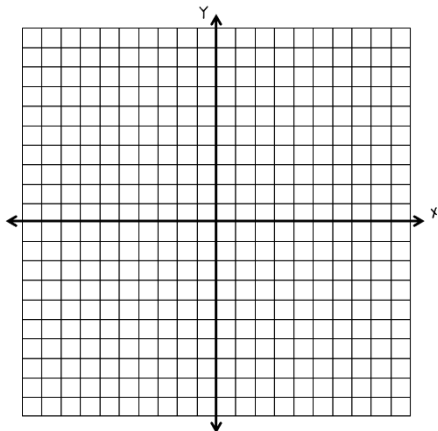8. $10 + 3x - 12 = -2 + 3x$ 9. $12(x - 3) = 10 + 2(6x - 10)$

10. $8(x - 3) + 15 = 55$ 11. $6(2x - 2) = 24$

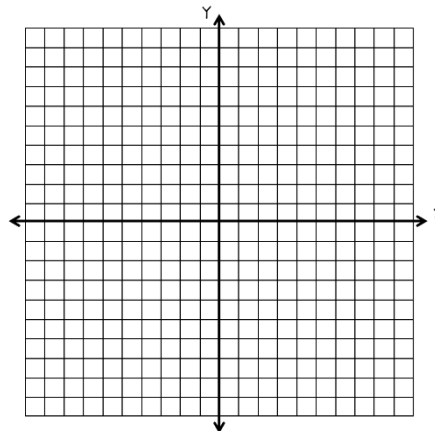# Expressions & Equations – 8.EE.8

Solve each system by graphing.
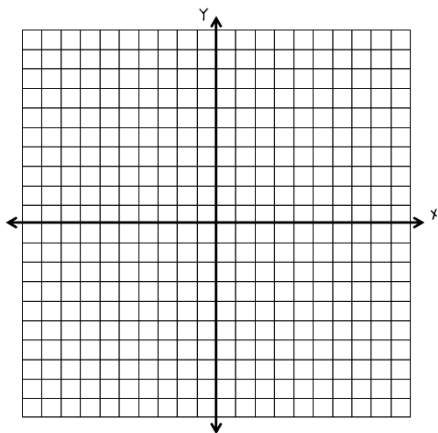
1. $\begin{cases} y = 2x + 3 \\ y = -2x + 3 \end{cases}$
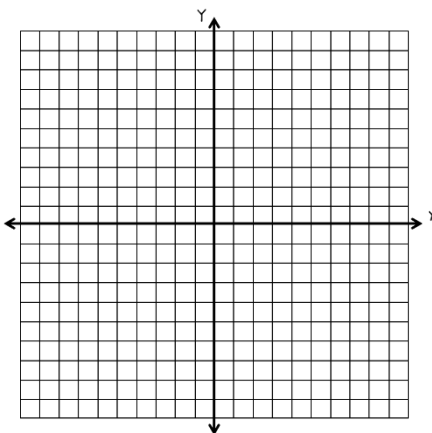
2. $\begin{cases} y = x - 7 \\ y = -2x + 11 \end{cases}$
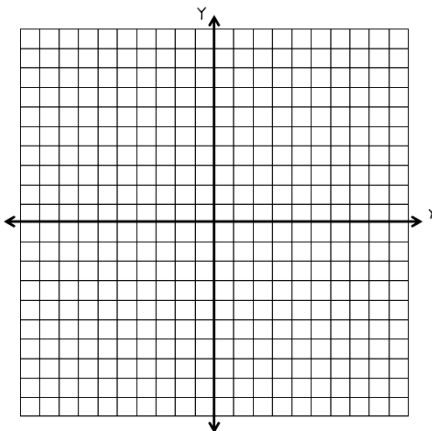
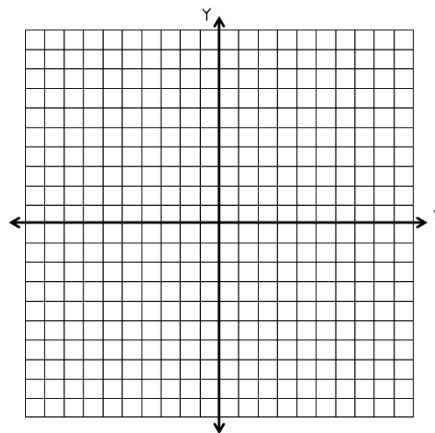3. $\begin{cases} y = x - 6 \\ y = -\frac{4}{5}x + 3 \end{cases}$

4. $\begin{cases} y = 4x + 1 \\ y = 4x - 2 \end{cases}$

5. $\begin{cases} y = 3x \\ y = 4 \end{cases}$

6. $\begin{cases} y = 4x - 2 \\ y = -3x + 5 \end{cases}$

Tell whether the ordered pair is a solution of the given system.

7. $(-2, -4)$ $\begin{cases} y = \frac{1}{2}x - 3 \\ y = -2x - 8 \end{cases}$
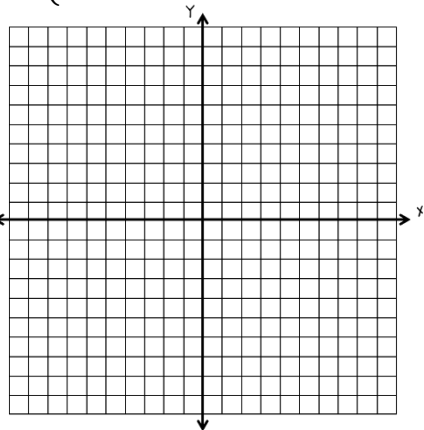
8. $(6, 4)$ $\begin{cases} y = x + 2 \\ y = 2x - 2 \end{cases}$
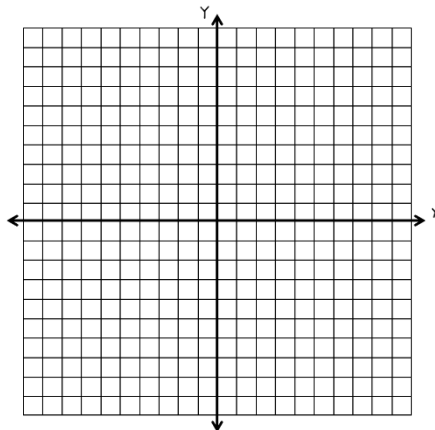
Name: _____   Date: _____   Hour: _____

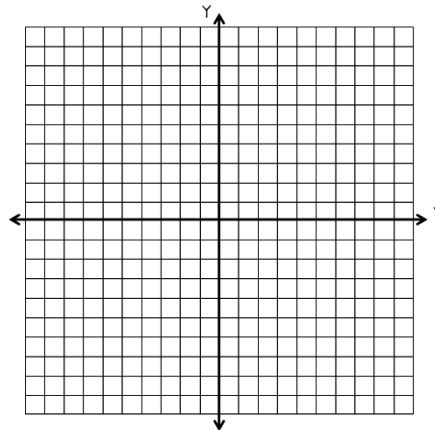# Expressions & Equations – 8.EE.8

Solve each system by graphing.

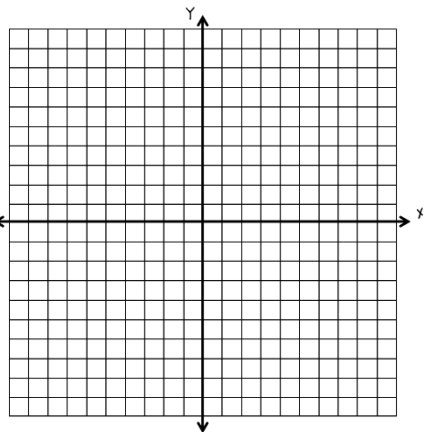1. $\begin{cases} 3x + y = 5 \\ -\frac{1}{2}x + y = 5 \end{cases}$
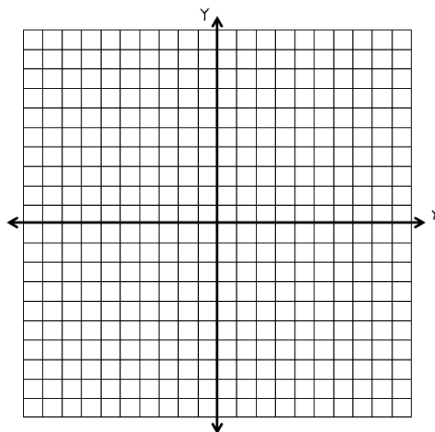
2. $\begin{cases} x + y = 6 \\ -x + y = -2 \end{cases}$

3. $\begin{cases} y = 3x - 1 \\ 2x + y = -6 \end{cases}$

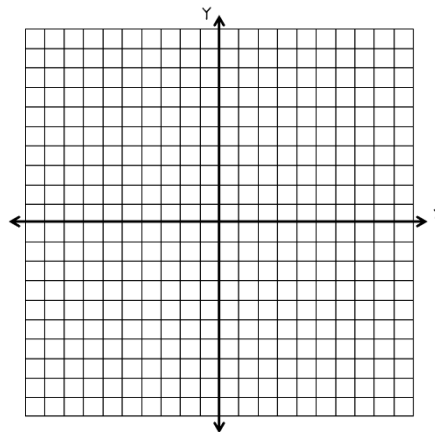4. $\begin{cases} 3x + y = -8 \\ -2x + y = 7 \end{cases}$

5. $\begin{cases} 6x + 3y = 9 \\ 8x - 2y = 18 \end{cases}$

6. $\begin{cases} -2x + 4y = 12 \\ 5x - 2y = 10 \end{cases}$

Fill in the following blanks about the steps to graphing a system of equations:

7. Make sure both equations are in _____ _____ form.

8. Graph both lines on the same _____ _____.

9. Find the _____ of _____.

10. _____ your answer.

Expressions & Equations – 8.EE.8

Solve each system by substitution.

1. $\begin{cases} x = 8 \\ 2x + y = 12 \end{cases}$

2. $\begin{cases} y = 6 \\ x + y = -2 \end{cases}$

3. $\begin{cases} y = -1 \\ x + 2y = -6 \end{cases}$

4. $\begin{cases} y = 2x \\ x + y = 9 \end{cases}$

5. $\begin{cases} x = y \\ 2x + 2y = 8 \end{cases}$

6. $\begin{cases} x = -2y \\ x - y = 9 \end{cases}$

7. $\begin{cases} y = -4x + 2 \\ y = 6x - 8 \end{cases}$

8. $\begin{cases} y = 2x + 4 \\ y = 2x + 4 \end{cases}$

9. $\begin{cases} y = 6x - 1 \\ y = 6x + 3 \end{cases}$

10. $\begin{cases} 3x + y = 4 \\ -4x + y = -10 \end{cases}$

11. $\begin{cases} x + 5y = 13 \\ 2x - 4y = -16 \end{cases}$

12. $\begin{cases} 3x + y = 4 \\ 2x - y = 6 \end{cases}$

Expressions & Equations – 8.EE.8

Solve each system by elimination.

1. $\begin{cases} x + y = 8 \\ x - y = -4 \end{cases}$

2. $\begin{cases} x + y = 6 \\ x - y = -4 \end{cases}$

3. $\begin{cases} x + y = 6 \\ -x + y = -10 \end{cases}$

4. $\begin{cases} -x + y = 2 \\ x + y = 8 \end{cases}$

5. $\begin{cases} 2x + y = 4 \\ 3x - y = 11 \end{cases}$

6. $\begin{cases} 2x - 3y = -4 \\ x + 3y = 7 \end{cases}$

7. $\begin{cases} -3x - 6y = -12 \\ 6x + 12y = 11 \end{cases}$

8. $\begin{cases} 2x + 2y = 14 \\ -4x + 3y = -7 \end{cases}$

9. $\begin{cases} 4x - 3y = 9 \\ -2x + y = -5 \end{cases}$

10. $\begin{cases} 8x - 5y = -18 \\ 4x - 4y = 0 \end{cases}$

Expressions & Equations – 8.EE.8

Solve the following word problems. Be sure to label your variables and write a system of equations then solve.

1) Ms. Jones took her family and friends to the movies. There were a total of 12 people. Children tickets cost $5 and adult tickets cost $10. She spent a total of $95. How many children went to the movies?

2) The Roosevelt Middle School band is having a fundraiser. They sold a total of 300 hotdogs and hamburgers. Hotdogs sold for $2 and hamburgers sold for $3. They made a total of $780. How many individual hamburgers and hotdogs did they sell?

3) The basketball team scored 89 points in just two- and three-point baskets. The number of two-point baskets was 27 more than the number of three-point baskets. How many two-point and three-pointers did the team make?

4) For dinner, Jerry had a double cheeseburger and two medium fries totaling 1200 calories. Joe has two double cheeseburgers and one medium fry totaling 1260 calories. How many calories are in one double cheeseburger and one order of medium fries?

5) A farmhouse shelters 16 animals. Some of them are chickens and the others are cows. Altogether these animals have 60 legs. How many chickens and how many cows are in the farmhouse?

Expressions & Equations – 8.EE.1

Simplify

1. $x^5 \cdot x^2$

$\boldsymbol{x^7}$

2. $y^3 \cdot y^7$

$\boldsymbol{y^{10}}$

3. $b^4 \cdot b^{12}$

$\boldsymbol{b^{16}}$

4. $c^3 c^5 c^2$

$\boldsymbol{c^{10}}$

5. $a^3 a^1 a^8$

$\boldsymbol{a^{12}}$

6. $(y^2)^4$

$\boldsymbol{y^8}$

7. $(m^3)^5$

$\boldsymbol{m^{15}}$

8. $(2x^4)^2$

$\boldsymbol{4x^8}$

9. $(3y^2)^3$

$\boldsymbol{27y^6}$

10. $(b^7)^0$

$\boldsymbol{1}$

11. $(s^2)^6 \cdot s^5$

$\boldsymbol{s^{17}}$

12. $t^x \cdot t^y$

$\boldsymbol{t^{x+y}}$

Find the missing exponent in each expression.

13. $x^{} \cdot x^5 = x^7$

$\boldsymbol{2}$

14. $b^{} \cdot b^3 = b^8$

$\boldsymbol{5}$

15. $y^4 \cdot y^{} = y^{11}$

$\boldsymbol{7}$

16. $m^4 \cdot m^{} = m^5$

$\boldsymbol{1}$

Solve the following:

17. $(a^2 b)^4 \cdot (a^3 b^5)^2$

$$\boldsymbol{a^8 b^4 a^6 b^{10}}$$
$$\boldsymbol{a^{14} b^{14}}$$

Name: _____ Date: _____ Hour: _____

Expressions & Equations – 8.EE.1

Simplify – Your answers must contain positive exponents

1. $x^7 \cdot x^{-2}$

x^5

2. $y^7 \cdot y^4 \cdot y$

y^{12}

3. $(b^4)^{-2}$

$\dfrac{1}{b^8}$

4. $\dfrac{5x^{-4}}{x^{-9}}$

$5x^5$

5. $\dfrac{b^4}{b^6}$

$\dfrac{1}{b^2}$

6. $(y^{-2})^4$

$\dfrac{1}{y^8}$

7. $\dfrac{x^3 \cdot x^4}{x^2}$

x^5

8. $\dfrac{r^2 t^{-3}}{r^{-3} t^5}$

$\dfrac{r^5}{t^8}$

9. $2x^{-2}$

$\dfrac{2}{x^2}$

10. $(b^7 x^3)^0$

1

11. $(s^2 \cdot s^5)^{-4}$

$\dfrac{1}{s^{28}}$

12. $(x^{-2}y)^{-3}$

$\dfrac{x^6}{y^3}$

13. $\left(\dfrac{x^4 y^{-8}}{x^{-3} y^4}\right)^2$

$\dfrac{x^8 y^{-16}}{x^{-6} y^8} = \dfrac{x^{14}}{y^{24}}$

14. $\dfrac{x^3 y}{x y^5} \cdot \dfrac{x^2 y^9}{x^8}$

$\dfrac{x^5 y^{11}}{x^9 y^5} = \dfrac{y^6}{x^4}$

Solve the following:

15. $(5x^7 y^3 z^{-1})^2 \cdot (2xy^{-5})^3 \cdot (2y^{-3} z^2)^3$

$25x^{14} y^6 z^{-2} 8x^3 y^{-15} 8y^{-9} z^6$

$\dfrac{1,600 x^{17} z^4}{y^{18}}$

Expressions & Equations − 8.EE.2

Evaluate the following expressions:

1. $\sqrt{64}$ = **-8 or 8**

2. $9^2 =$ **81**

3. $\sqrt[3]{125}$ = **5**

4. $5^2 + 2^3 =$ **33**

5. $\sqrt{30 + 6}$ = **-6 or 6**

6. $2^2 =$ **4**

7. $\sqrt[3]{27} + 2^3 =$ **11**

8. $5^2 + 5 =$ **30**

9. $\sqrt{144} + 7 =$ **-5 or 19**

10. $\sqrt{16} + 4^2 =$ **12 or 20**

11. $\sqrt[3]{27} + \sqrt{16} =$ **-1 or 7**

12. $\sqrt[3]{64} + 4^3 =$ **68**

13. $\sqrt{100} + 10 =$ **0 or 20**

14. $7^2 + 4^2 =$ **65**

15. $\sqrt[3]{27} + 3 =$ **6**

16. $\sqrt{4} + \sqrt{16} =$ **-6, -2, 2 or 6**

Expressions & Equations − 8.EE.2

Solve each equation for the unknown variable. Round your answers to the nearest tenth if necessary.

1. $x^3 = 27$
$x = 3$

2. $x^2 = 49$
$x = \pm 7$

3. $m^3 = 8$
$m = 2$

4. $y^2 = 64$
$y = \pm 8$

5. $b^2 = 100$
$b = \pm 10$

6. $h^3 = 100$
$h = 4.6$

7. $j^3 = 64$
$j = 4$

8. $n^2 = 50$
$n = \pm 7.1$

9. $a^2 = 121$
$a = \pm 11$

10. $c^3 = 150$
$c = 5.3$

11. $r^2 = 80$
$r = \pm 8.9$

12. $x^3 = 125$
$x = 5$

13. $l^3 = 512$
$l = 8$

14. $t^2 = 81$
$t = \pm 9$

15. $k^2 = 169$
$k = \pm 13$

16. $b^3 = 1000$
$b = 10$

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.3

1) Fill in the following table:

10^{-6}	10^{-5}	10^{-4}	10^{-3}	10^{-2}	10^{-1}	10^0	10^1	10^2	10^3	10^4	10^5	10^6
$\frac{1}{1000000}$	$\frac{1}{100000}$	$\frac{1}{10000}$	$\frac{1}{1000}$	$\frac{1}{100}$	$\frac{1}{10}$	1	10	100	1000	10000	100000	1000000

Estimate the following values by rewriting them as a single digit times a power of ten.

2) 2,479

2×10^3

3) 431,056

4×10^5

4) 2,943,450

3×10^6

5) 123,488

1×10^5

6) 9,765,344

10×10^6

7) 805,465,321

8×10^8

8) 0.000678

7×10^{-4}

9) 0.345001

4×10^{-1}

10) 0.000000002

2×10^{-9}

11) 0.00000418

4×10^{-6}

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.3

1) Which of the following has a value greater than 200 but less than 2,000

        A. 2.5×10^3 C. 7.2×10^4

        B. 3.2×10^2 D. 2.8×10^1

2) Which of the following has a value greater than 500 but less than 1,000

        A. 5.1×10^2 C. 9.2×10^3

        B. 3.8×10^2 D. 5.8×10^1

3) Which of the following has a value greater than 450 but less than 890

        A. 7.4×10^3 C. 3.8×10^2

        B. 6.2×10^1 D. 8.8×10^2

4) In 2016, the population of the United States was approximately 3.24×10^8. It is expected that the population will be about 3.98×10^8 in 2050. Which shows the growth population, written in scientific notation?

        A. 7.4×10^{-1} C. 7.4×10^8

        B. 7.4×10^7 D. 7.4×10^{-2}

5) A small town in Kansas started with a population of 2,300 people 80 years ago. Now, the town has experienced significant growth and has a population of about 3,234,956 people. Approximately how many times larger is the current population in the Kansas town than it was 80 years ago?

$$\mathbf{1.5 \times 10^5}$$

Expressions & Equations – 8.EE.4

Write each number in scientific notation

1. 27,001

$$2.7001 \times 10^4$$

2. 0.34156020

$$3.415602 \times 10^{-1}$$

3. 0.0089

$$8.9 \times 10^{-3}$$

4. 134

$$1.34 \times 10^2$$

4. 901,034

$$9.01034 \times 10^5$$

5. 0.000004

$$4 \times 10^{-6}$$

6. There are about 270000000000000 red blood cells in the human body.

$$2.7 \times 10^{14}$$

7. It is 380000000 meters from the Earth to the moon

$$3.8 \times 10^8$$

8. Americans drink 145000000000 cups of coffee per year.

$$1.45 \times 10^{11}$$

9. A fly weighs 0.0000000000431 times as much as an elephant.

$$4.31 \times 10^{-11}$$

10. What is 1.47×10^{-1}? Is this the same as 147 thousandths?

$$0.147 - yes$$

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.4

State whether the following is in scientific notation or not. If it is not explain why.

1. 12.345×10^2 **No because of the 12 the digit must be equal to or greater than 1 but less than 10**

2. 3.42×10^{-5} **Yes**

3. 2×10^4 **Yes**

4. 0.321×10^3 **No because the number is to small, it must be equal to or greater than one but less than 10**

5. 3.21×10^0 **Yes**

Solve the following:

6. $(2 \times 10^3) \times (4 \times 10^2)$ 7. $(3 \times 10^5) \times (5 \times 10^4)$

$\mathbf{8 \times 10^5}$ $\mathbf{15 \times 10^9 = 1.5 \times 10^{10}}$

8. $(8 \times 10^6) \div (4 \times 10^3)$ 9. $(4 \times 10^2) \div (8 \times 10^7)$

$\mathbf{2 \times 10^3}$ $\mathbf{0.5 \times 10^{-5} = 5 \times 10^{-6}}$

10. $(9 \times 10^2) + (1 \times 10^4)$ 11. $(5 \times 10^5) + (2 \times 10^4)$

$\mathbf{1.09 \times 10^4}$ $\mathbf{5.2 \times 10^5}$

12. $(5 \times 10^3) - (8 \times 10^2)$ 13. $(7 \times 10^{10}) - (3.5 \times 10^8)$

$\mathbf{4.2 \times 10^3}$ $\mathbf{6.965 \times 10^{10}}$

Expressions & Equations – 8.EE.5

Determine if the following graphs have a slope that is positive, negative, zero, or undefined.

1)

Zero

2)

**Negative**

3)

Undefined

4)
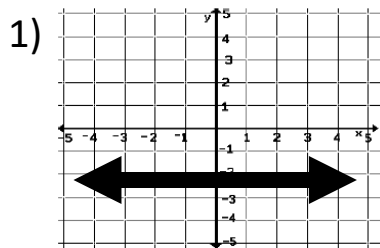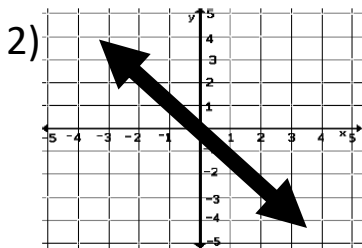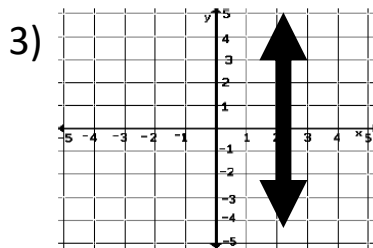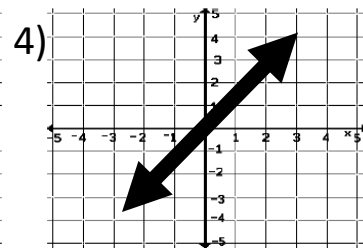
Positive

Determine if the following statements are true or false. If false make the statement true.

5) **True** A proportional relationship has a constant rate of change.

6) **False** A proportional relationship has a graph that is linear or ~~non-linear~~.

7) **False** A proportional relationship always passes through the ~~point (1, 1)~~. **Origin (0,0)**

Find the slope or unit rate of the proportional relationships shown:

8)

$-\dfrac{2}{3}$

9)

4

10)

$\dfrac{1}{5}$
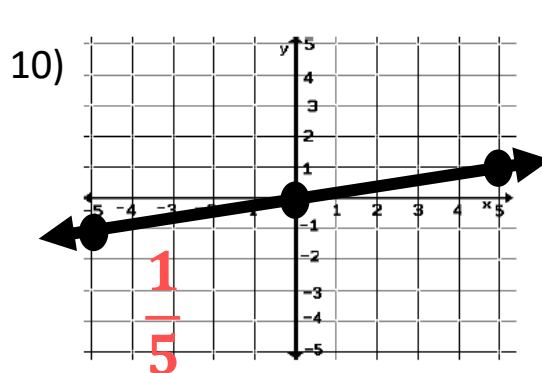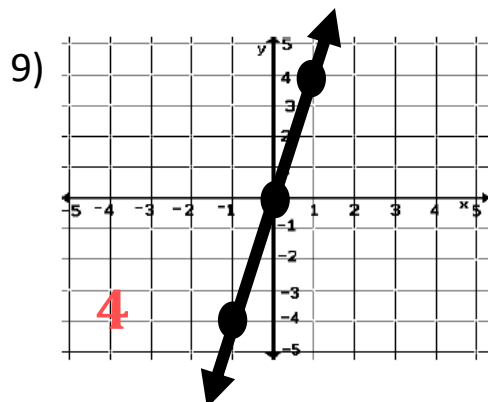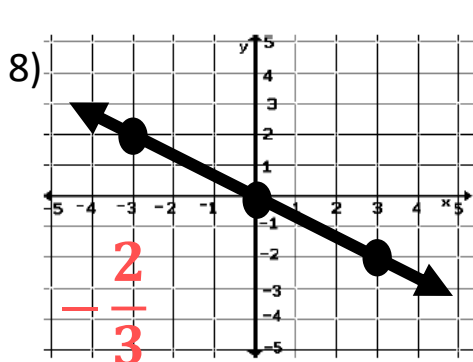
11) $y = 5x$

5

12) $2y = 10x$

5

13) $y = \dfrac{1}{4}x$

$\dfrac{1}{4}$

14)

Week	1	2	5	10
Amount	120	140	200	300

$120 per week

15)

Time (hours)	5	10	15	20
Distance (miles)	25	50	75	100

5 miles per hour

Expressions & Equations – 8.EE.5

1) Compare the following graph and table to determine which object is moving at a greater speed and explain your answer.
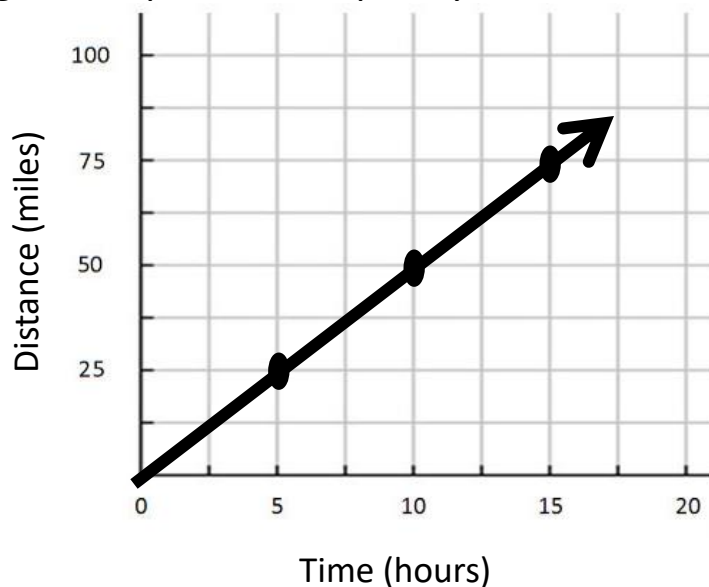
Time (hours)	4	8	12	16
Distance (miles)	15	30	45	60

The graph's object is moving at a rate of 5 miles per hour and the tables object is moving at a rate of 3.75 miles per hour. Therefore the graphs object is traveling at a faster rate.

2) Compare the following equation and graph to determine which object is moving at a greater speed and explain your answer.

$$d = 15t$$

Where d = distance (miles)
and t = time (minutes)
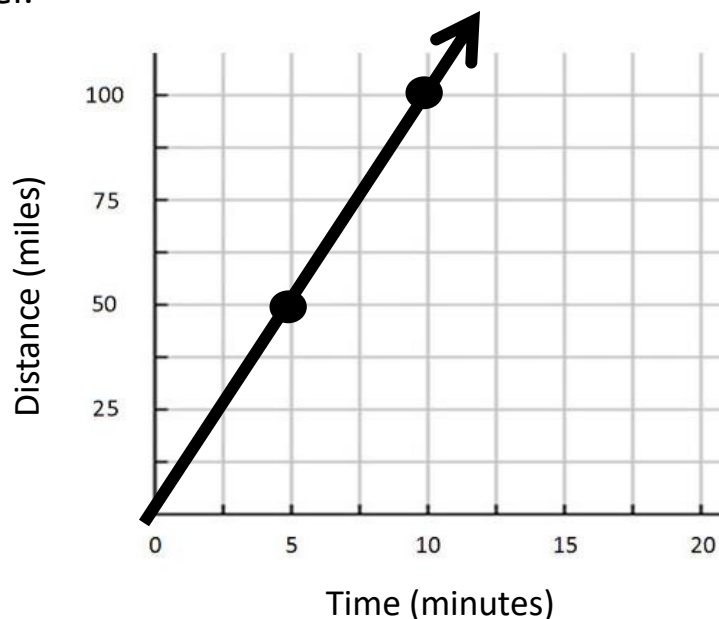
The graph's object is moving at a rate of 10 miles per minute and the equations object is moving at a rate of 15 miles per minute Therefore the equations object is traveling at a faster rate.

Name: _____ Date: _____ Hour: _____

Expressions & Equations – 8.EE.6

1. What is slope intercept form of a linear equation? _____

Find the slope and y – intercept of each of the following lines:

2. $y = 4x - 6$
m = 4
b = (0, -6)

3. $y = -x - 4$
m = -1
b = (0, -4)

4. $y = 3x$
m = 3
b = (0, 0)

5. $y = \frac{1}{2}x + 2$
m = 1/2
b = (0, 2)

6. $y = 2x - 5$
m = 2
b = (0, -5)

7. $y = -\frac{2}{3}x - 3$
m = -2/3
b = (0, -3)

Write an equation in slope intercept form for the following problems:

8. slope = 6 and y – intercept (0, -8)

$$y = 6x - 8$$

9. slope = -1 and y – intercept (0, 2)

$$y = -x + 2$$

10. slope = $\frac{4}{5}$ and y – intercept (0, -1)

$$y = -\frac{4}{5}x - 1$$

11. slope = -3 and y – intercept (0, 5)

$$y = -3x + 5$$

12. slope = 2 and y – intercept (0, 3)

$$y = 2x + 3$$

13. slope = $\frac{2}{3}$ and y – intercept (0, 0)

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

14. What is the slope formula? $\dfrac{y_2 - y_1}{x_2 - x_1}$ where (x_1, y_1) and (x_2, y_2)

Find the slope of the line that passes through each pair of points.
Show all your work!

15. (8, 7) (3, 6)

$$\frac{1}{5}$$

16. (3, 2) (5, 4)

$$1$$

17. (-2, -2) (-4, 1

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

18. (3, 2) (3, -2)

$$Undefined$$

19. (3, -6) (2, -4)

$$-2$$

20. (0, 4) (4, 4)

$$0$$

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.6

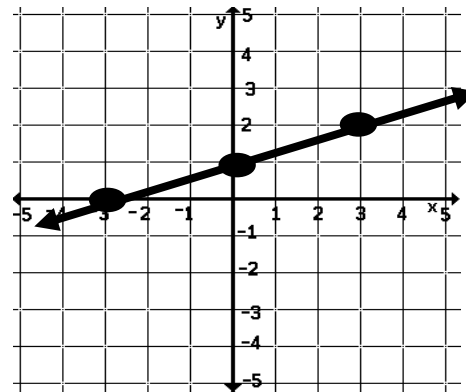Write the equation in slope intercept form for the following graphs:
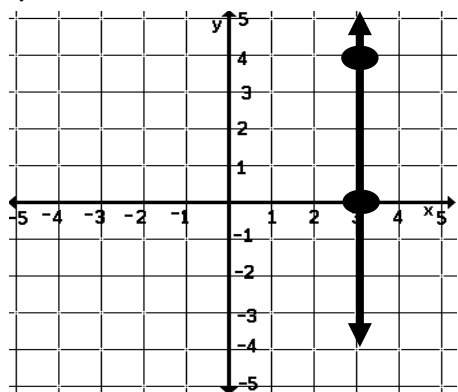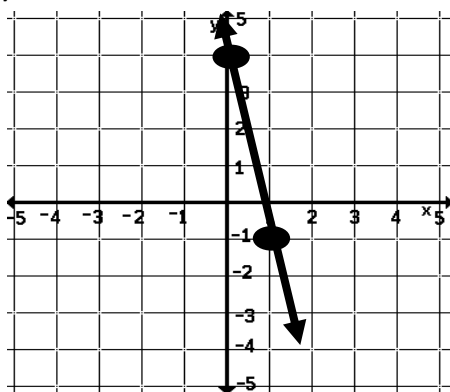
1) $y = \frac{1}{4}x + 2$
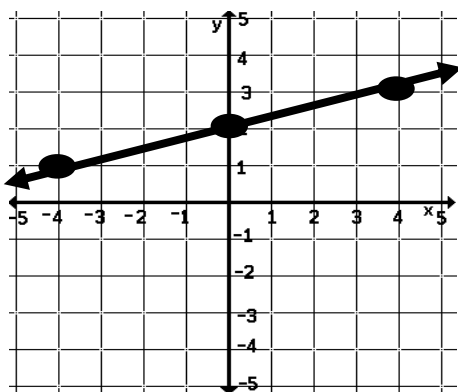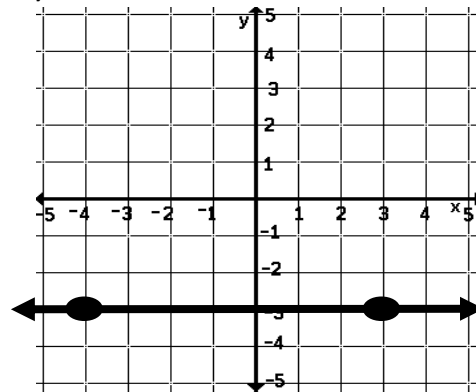
2) $y = -x - 5$
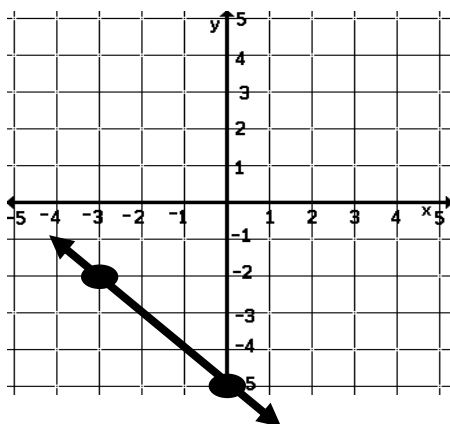
3) $y = \frac{1}{3}x + 1$
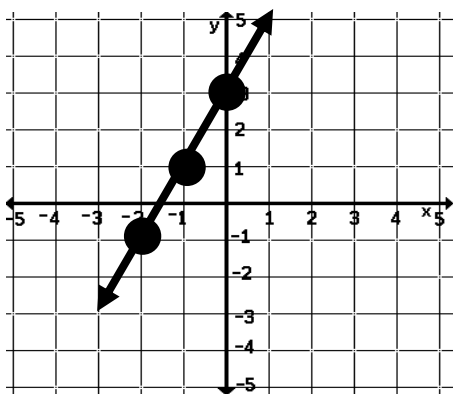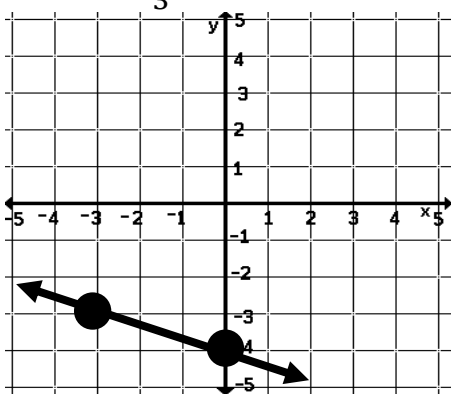
4) $x = 3$

5) $y = -5x + 4$
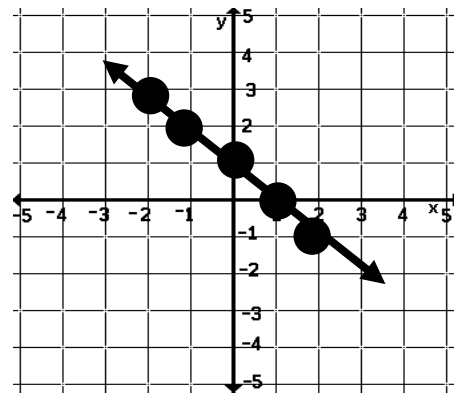
6) $y = -3$

Graph the following equations:

7) $y = 2x + 3$

8) $y = -\frac{1}{3}x - 4$

9) $y = -x + 1$

Expressions & Equations – 8.EE.7

Solve the following:

1. $x - 12 + 5x = 24$
x = 6

2. $4y + 6 - 2y = 14$
y = 4

3. $2x - 8 + 3x = 7$
x = 3

4. $5a - 1 + a = 11$
a = 2

5. $-6(8x - 3) = 114$
x = -2

6. $-3 = 4x + 6 - x$
x = -3

7. $\frac{1}{2}b + \frac{3}{2}b + 7 = 21$
b = 7

8. $3(2x - 7) + 4 = 13$
x = 5

Match the following vocabulary words to the correct definition:

9. ___**C**___ Expression

10. ___**D**___ Terms

11. ___**B**___ Coefficient

12. ___**A**___ Like Terms

A. Terms that have the same base, variable, and exponent
B. The number in front of a variable
C. A mathematical phrase that can contains numbers, variables and operators
D. A constant or a variable in an expression

13. One students worked the equation below, and their work is shows. Work through the problems, and check to see if any mistakes were made. If so, state on which line the error was made and how it should be corrected.

Equation #1

Line 1: $9x + 2 + 3x - 7 = 15$

Line 2: $12x + 9 = 15$ **- Line 2: $12x - 5 = 15$**

Line 3: $12x = 24$ **- Line 3: $12x = 20$**

Line 4: $x = 2$ **- Line 4: $x = \frac{5}{3}$**

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.7

Solve the following:

1. $7x - 11 = -19 + 3x$

x = -2

2. $11a + 9 = 4a + 30$

a = 3

3. $19c + 31 = 26c - 74$

c = 15

4. $10a - 37 = 6a + 51$

a = 22

5. $5w + 9.9 = 4.8 + 8w$

w = 1.7

6. $15 - x = 2(x + 3)$

x = 3

7. $4(3d - 2) = 88d - 5$

d = -0.0395

8. $15y + 14 = 2(5y + 6)$

y = -0.4

9. $\frac{1}{2}(6x - 4) = 4x - 9$

x = 7

10. $3(2x + 1) = 5(x - 4)$

x = -23

11. $\frac{1}{4}(40 - 8x) = 19x + 2 - 5x$

x = 2

12. $-5x + 12 - 7x = -3(5x + 8)$

x = -12

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.7

Match the following examples to the correct special case

1. ___**B**_____ x = x   A. No Solution
2. ___**C**_____ x = 5   B. Infinite Solutions
3. ___ **A**_____ x = y   C. One Solution

Solve the following equations:

4. $2x + 3x + 8 = 5x + 8$ 5. $-7x - 3x + 2 = -10x + 9$

Infinite Solutions   **No Solution**

6. $4(3d + 2) = 22d - 2$ 7. $9 + 8x = 8x - 9$

d = 1   **No Solution**

8. $10 + 3x - 12 = -2 + 3x$ 9. $12(x - 3) = 10 + 2(6x - 10)$

Infinite Solutions   **No Solution**

10. $8(x - 3) + 15 = 55$ 11. $6(2x - 2) = 24$

x = 8   **x = 3**

Name: _____ Date: _____ Hour: _____

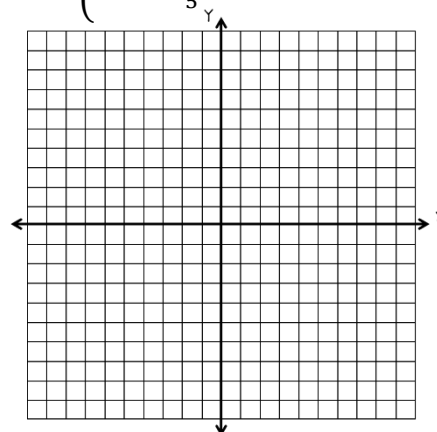# Expressions & Equations – 8.EE.8

Solve each system by graphing.

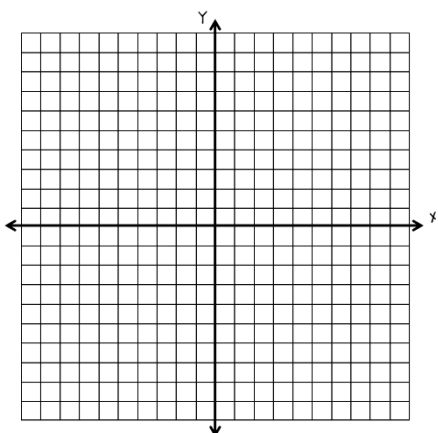1. $\begin{cases} y = 2x + 3 \\ y = -2x + 3 \end{cases}$ (0, 3)
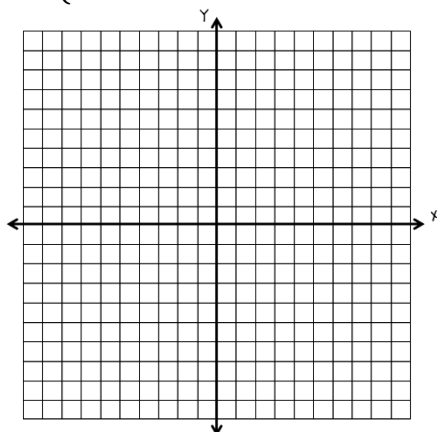
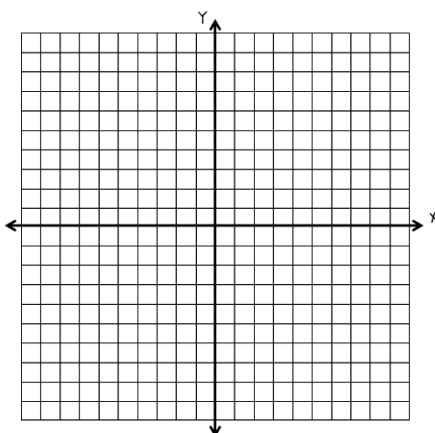2. $\begin{cases} y = x - 7 \\ y = -2x + 11 \end{cases}$ (6, -1)
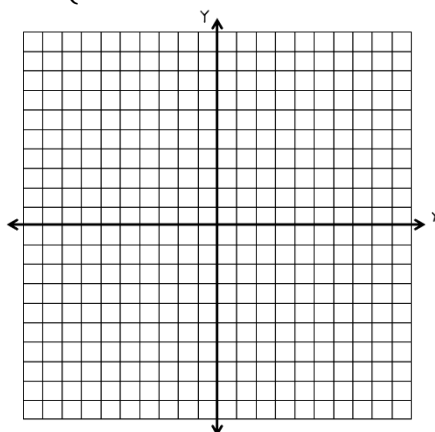
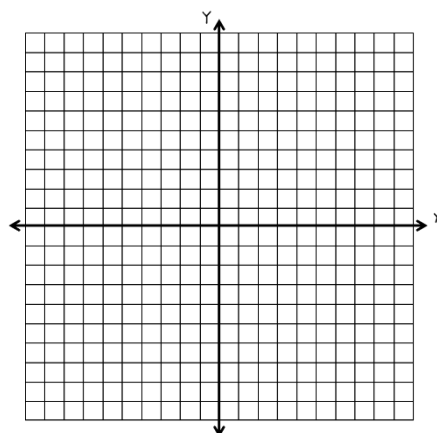3. $\begin{cases} y = x - 6 \\ y = -\frac{4}{5}x + 3 \end{cases}$ (5, -1)

4. $\begin{cases} y = 4x + 1 \\ y = 4x - 2 \end{cases}$ No Solution

5. $\begin{cases} y = 3x \\ y = 4 \end{cases}$ $(\frac{4}{3}, 4)$

6. $\begin{cases} y = 4x - 2 \\ y = -3x + 5 \end{cases}$ (1, 2)

Tell whether the ordered pair is a solution of the given system.

7. $(-2, -4)$ $\begin{cases} y = \frac{1}{2}x - 3 \\ y = -2x - 8 \end{cases}$

Yes

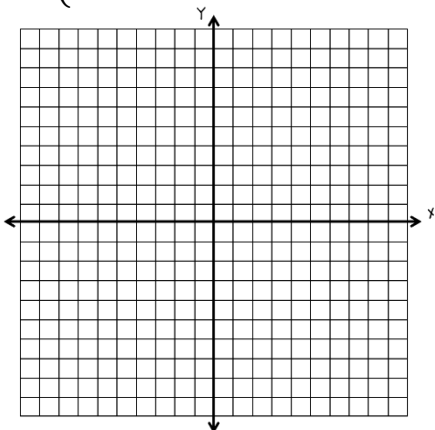8. $(6, 4)$ $\begin{cases} y = x + 2 \\ y = 2x - 2 \end{cases}$

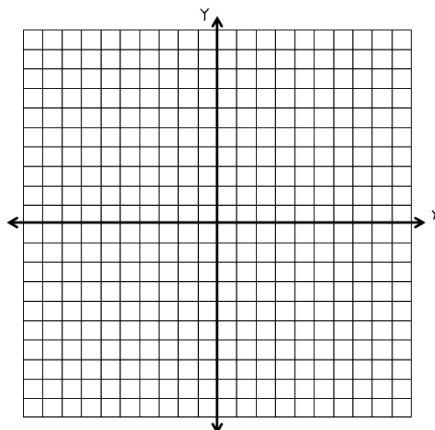No it would be a solution if the ordered pair was (4, 6)

Expressions & Equations – 8.EE.8
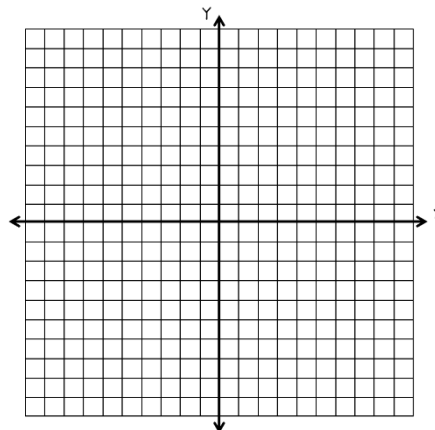
Solve each system by graphing.

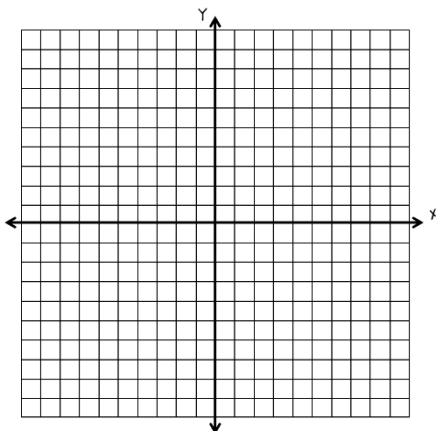1. $\begin{cases} 3x + y = 5 \\ -\frac{1}{2}x + y = 5 \end{cases}$ **(0, 5)**

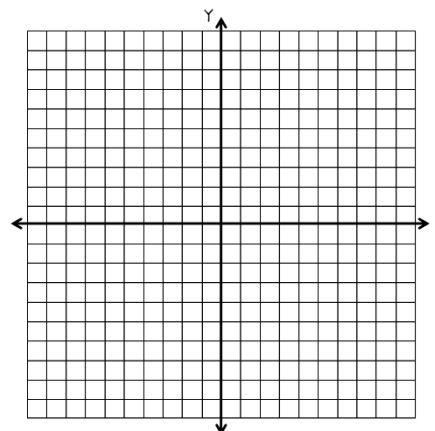2. $\begin{cases} x + y = 6 \\ -x + y = -2 \end{cases}$ **(4, 2)**

3. $\begin{cases} y = 3x - 1 \\ 2x + y = -6 \end{cases}$ **(-1, -4)**
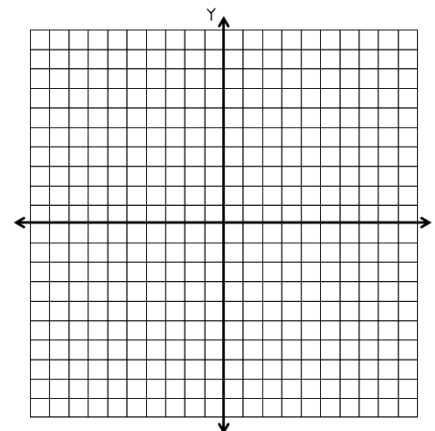
4. $\begin{cases} 3x + y = -8 \\ -2x + y = 7 \end{cases}$ **(-3, 1)**

5. $\begin{cases} 6x + 3y = 9 \\ 8x - 2y = 18 \end{cases}$ **(2, -1)**

6. $\begin{cases} -2x + 4y = 12 \\ 5x - 2y = 10 \end{cases}$ **(4, 5)**

Fill in the following blanks about the steps to graphing a system of equations:

Slope   intercept

7. Make sure both equations are in Coordinate plane _____ form.

8. Graph both Point lines on the same Intersection _____.

9. Find the Check _____ of _____.

10. _____ your answer.

Expressions & Equations – 8.EE.8

Solve each system by substitution.

1. $\begin{cases} x = 8 \\ 2x + y = 12 \end{cases}$

(8, -4)

2. $\begin{cases} y = 6 \\ x + y = -2 \end{cases}$

(-8, 6)

3. $\begin{cases} y = -1 \\ x + 2y = -6 \end{cases}$

(-4, -1)

4. $\begin{cases} y = 2x \\ x + y = 9 \end{cases}$

(3, 6)

5. $\begin{cases} x = y \\ 2x + 2y = 8 \end{cases}$

(2, 2)

6. $\begin{cases} x = -2y \\ x - y = 9 \end{cases}$

(6, -3)

7. $\begin{cases} y = -4x + 2 \\ y = 6x - 8 \end{cases}$

(1, -2)

8. $\begin{cases} y = 2x + 4 \\ y = 2x + 4 \end{cases}$

Infinite Solutions

9. $\begin{cases} y = 6x - 1 \\ y = 6x + 3 \end{cases}$

No Solution

10. $\begin{cases} 3x + y = 4 \\ -4x + y = -10 \end{cases}$

(2, -2)

11. $\begin{cases} x + 5y = 13 \\ 2x - 4y = -16 \end{cases}$

(-2, 3)

12. $\begin{cases} 3x + y = 4 \\ 2x - y = 6 \end{cases}$

(2, -2)

Name: _____   Date: _____   Hour: _____

Expressions & Equations − 8.EE.8

Solve each system by elimination.

1. $\begin{cases} x + y = 8 \\ x - y = -4 \end{cases}$

(2, 6)

2. $\begin{cases} x + y = 6 \\ x - y = -4 \end{cases}$

(1, 5)

3. $\begin{cases} x + y = 6 \\ -x + y = -10 \end{cases}$

(4, 2)

4. $\begin{cases} -x + y = 2 \\ x + y = 8 \end{cases}$

(3, 5)

5. $\begin{cases} 2x + y = 4 \\ 3x - y = 11 \end{cases}$

(3, -2)

6. $\begin{cases} 2x - 3y = -4 \\ x + 3y = 7 \end{cases}$

(1, 2)

7. $\begin{cases} -3x - 6y = -12 \\ 6x + 12y = 11 \end{cases}$

No Solution

8. $\begin{cases} 2x + 2y = 14 \\ -4x + 3y = -7 \end{cases}$

(4, 3)

9. $\begin{cases} 4x - 3y = 9 \\ -2x + y = -5 \end{cases}$

(3, 1)

10. $\begin{cases} 8x - 5y = -18 \\ 4x - 4y = 0 \end{cases}$

(-6, -6)

Name: _____   Date: _____   Hour: _____

Expressions & Equations – 8.EE.8

Solve the following word problems. Be sure to label your variables and write a system of equations then solve.

1) Ms. Jones took her family and friends to the movies. There were a total of 12 people. Children tickets cost $5 and adult tickets cost $10. She spent a total of $95. How many children went to the movies?

c = children tickets
a = adult tickets
c + a = 12
5c + 10a = 95

7 adults and 5 children went to the movies.

2) The Roosevelt Middle School band is having a fundraiser. They sold a total of 300 hotdogs and hamburgers. Hotdogs sold for $2 and hamburgers sold for $3. They made a total of $780. How many individual hamburgers and hotdogs did they sell?

h = hotdogs
b = burgers
h + b = 300
2h + 3b = 780

They sold 180 hamburgers and 120 hotdogs.

3) The basketball team scored 89 points in just two- and three-point baskets. The number of two-point baskets was 27 more than the number of three-point baskets. How many two-point and three-pointers did the team make?

x = 2 point baskets
y = 3 point baskets
2x + 3y = 89
x = y + 27

The team made 7 three point baskets and 34 two point baskets.

4) For dinner, Jerry had a double cheeseburger and two medium fries totaling 1200 calories. Joe has two double cheeseburgers and one medium fry totaling 1260 calories. How many calories are in one double cheeseburger and one order of medium fries?

c = double cheeseburger
f = medium fries
c + 2f = 1200
2c + f = 1260

There are 440 calories in one double cheeseburger and 380 calories in one order of medium fries.

5) A farmhouse shelters 16 animals. Some of them are chickens and the others are cows. Altogether these animals have 60 legs. How many chickens and how many cows are in the farmhouse?

c = chickens
m = cows
c + m = 16
2c + 4m = 60

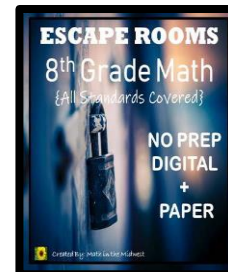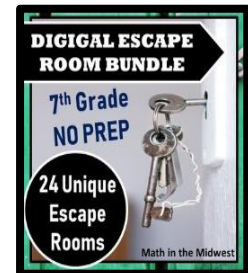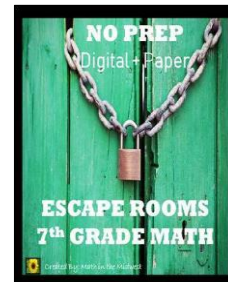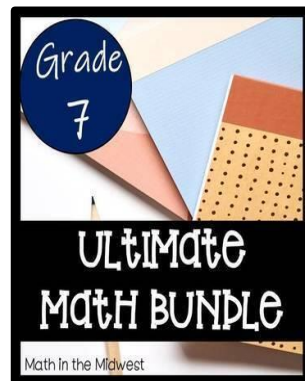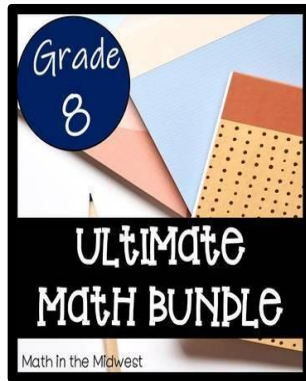There are 14 cows and two chickens.

Check out my other products!
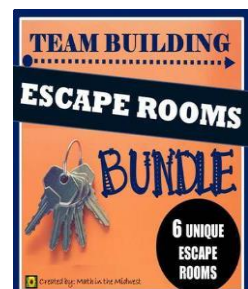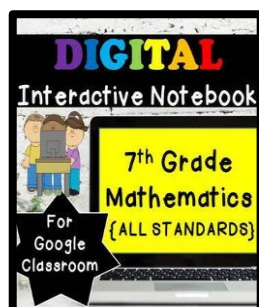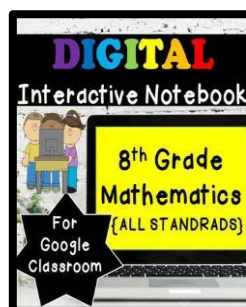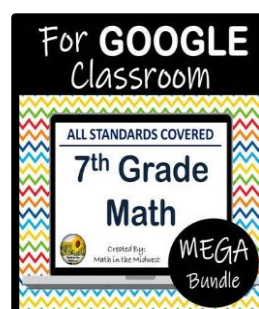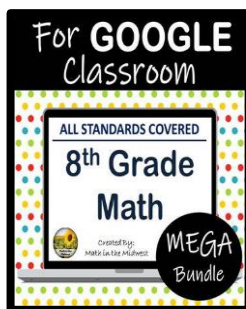
All you have to do is click on the images below
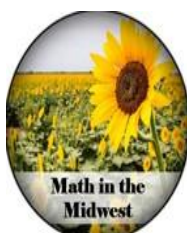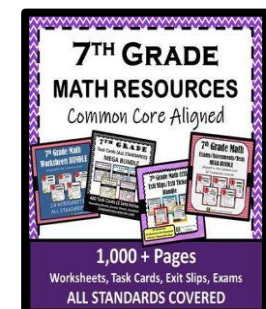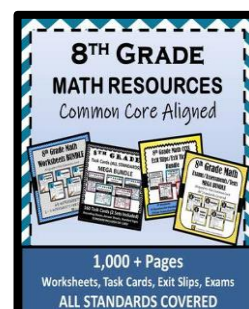
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