EOC Review- Unit 2: Linear Equations 2017

Standard	Summary	Practice Pg & #	Lesson Pg.
A-CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities	Pg. 64 #1-3	None
A-CED.4	Re-arrange formula; isolate variable	Pg.57 #10, 31	Pg. 57
REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Pg.65 #26, 28, 34	Pg. 58-59
REI.1	Explain each step in solving a simple equation	(No practice Problems)	N/A
REI.5	Systems (explain your steps/reasoning)	Pg. 156 #19 Pg. 164 #4-6	Pg. 158, 160, 163
REI.6	Systems (word problems- all 3 methods: Substitution, Elimination, Graphing)	(see REI.5)	(see REI.5)
REI.12	Graphing Inequalities	Pg. 6 #26, pg. 168 #1	Pg. 168
REI. 10	Y=mx+b; "which of the following points is on the line?"	Website (under Algebra Tab)	

4.12 Going Deeper into Solving Multi-Step Equations and Inequalities
(DOK 3)

Follow the instructions within each problem below. Show your work. (DOK 3)

1. Clive has $900 in his bank account at the beginning of the school semester. Clive is hoping to have at least $300 in his bank account at the end of the semester (18 weeks). If Clive only withdraws $35 a week for food, gas, and entertainment, will Clive be able to reach his goal at the end of the semester? Write an inequality that models the situation, and justify your response both in a written format and algebraically.

2. Christina's cell phone plan charges her $69 a month plus the square root of the sum of the number of minutes used and 2. If Christina's cell phone bill was $76 one month, how many minutes did Christina spend talking on the phone? Also, are there any mathematical constraints in the equation used by the cell phone company? If so, do the constraints make sense in terms of this problem? Explain your answer.

3. Brett decide to order some new books using a $50 gift card he received for his birthday. He decides to buy as many of a new series of books he can without exceeding the amount on his gift card. If each book cost $12.99 and shipping charges are $7.99 for any size order, then how many books can Brett purchase in one order? (Assume that tax, if applicable, is included in the purchase price.)

4. Mallory received her test back on radical equations. She missed the last problem:

   $-\sqrt{x+3} = 4$. The steps she followed are shown below.

   Step 1: $\dfrac{\cancel{-1}\sqrt{x+3}}{\cancel{-1}} = \dfrac{4}{-1}$

   $\sqrt{x+3} = -4$

   Step 2: $(\sqrt{x+3})^2 = (-4)^2$

   $x + 3 = 16$

   Step 3: $x + 3 - 3 = 16 - 3$

   Answer: $x = 13$

   After looking over her work, Mallory was still convinced that she has the correct answer. She asked to see the teacher's answer key and found the key states that the problem has no solution. Which is correct, Mallory's answer or the teacher's answer key? Create an argument for either Mallory or the answer key and justify your response mathematically.

4.7 Manipulating Formulas and Equations (DOK 2)

Sometimes you are given a formula such as $A = l \times w$ (A = area, l = length, and w = width) and you need to solve for w. For example: The area of a playground is 4500 square feet. The length is 600 feet. What is the width of the playground? Starting with $A = l \times w$, you need to solve for w. You need to have w on one side of the equation and all the other variables on the other.

$$A = l \times w \Rightarrow \frac{A}{l} = \frac{l \times w}{l} \Rightarrow \frac{A}{l} = w \Rightarrow w = \frac{A}{l}$$ You have solved $A = l \times w$ for w.

Solve each of the following formulas and equations for the given variable. (DOK 2)

1. $C = 2\pi r$ for r

2. $I = PRT$ for R

3. $V = \pi r^2 h$ for h

4. $A = \frac{1}{2}bh$ for h

5. $d = 4a + 3c$ for c

6. $h = 6a + 9c^2$ for a

7. $y = 4xz$ for z

8. $5t = 9y + 22$ for y

9. $17 - 9m = n - 23$ for n

10. $7x + 4 = \frac{9y}{4}$ for y

11. $8 + 2a = 5b - 6$ for b

12. $A = s^2$ for s

13. $a^2 + b^2 = c^2$ for a

14. $I = PRT$ for P

15. $x = 4a + 7$ for a

16. $9 - 5y = 6x + 2$ for x

17. $D = rt$ for r

18. $A = lw$ for w

19. $a^2 + b^2 = c^2$ for b^2

20. $C = 2dr$ for r

21. $V = \pi r^2 h$ for r

22. $V = \frac{1}{3}Bh$ for B

23. $A = \pi r^2$ for r

24. $S = 4\pi r^2$ for r

25. $y = \frac{1}{4}x + 5$ for x

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

27. $a = \frac{b}{3}$ for b

28. $c = 3d + \frac{2}{5}$ for d

29. $g = \frac{2}{3}h - 2$ for h

30. $r = s^2$ for s

31. $F = \frac{9}{5}C + 32$ for C

32. $y = mx + b$ for m

Chapter 4 Review

Solve each of the following equations. Show your work. (DOK 2)

1. $4a - 8 = 28$

3. $-7 + 23w = 108$

5. $c - 13 = 5$

2. $5 + \dfrac{x}{8} = -4$

4. $\dfrac{y - 8}{6} = 7$

6. $\dfrac{b + 9}{12} = -3$

Solve. Show your work. (DOK 2)

7. $19 - 8d = d - 17$

9. $3 - 6 - 2x = 4$

11. $w + 11 + 14 = 15$

8. $7w - 8w = -4w - 30$

10. $6 + 16x = -2x - 12$

12. $5k + 1 - 3 = 11$

Remove parentheses. (DOK 2)

13. $3(-4x + 7)$

15. $6(8 - 9b)$

17. $-2(5c - 3)$

14. $11(2y + 5)$

16. $-8(-2 + 3a)$

18. $-5(7y - 1)$

Solve for the variable. (DOK 2)

19. If $3x - y = 15$, then $y =$

21. $h = 6a + 9c^2$ for c

20. If $7a + 2b = 1$, then $b =$

22. $y = 4xz$ for x

Solve each of the following equations and inequalities. Show your work. (DOK 2)

23. $\dfrac{-11c - 35}{4} = 4c - 2$

25. $7 - 3x \le 6x - 2$

27. $-y > 14$

24. $4(2x + 3) \ge 2x$

26. $\dfrac{5(n + 4)}{3} = n - 8$

28. $2(3x - 1) \ge 3x - 7$

Solve the following problems. Show your work. (DOK 2)

29. $\dfrac{12}{x} - 5 = 1$

30. $4 + \dfrac{t}{5} = 6$

31. $\dfrac{24}{p} + 3 = -3$

Solve the following problems. Show your work. (DOK 2)

32. $\sqrt{x} - 7 = -1$

33. $9 + \sqrt{8t - 7} = 12$

34. $\sqrt{3n + 9} - 4 = 2$

Solve the following problems. Show your work. (DOK 2)

35. $-28 < 4x + 4 \le -8$

36. $11 > 2b - 6 > 0$

For the pairs of equations below, put each equation in slope-intercept form, and tell whether the graphs of the lines will be collinear, parallel, or intersecting. (DOK 2)

1. $3y = 2x + 9$
   $18 = 6y - 4x$

2. $-x + y = -5$
   $x - y = 5$

3. $y = 3x + 2$
   $y - 3x = 2$

4. $-x = y$
   $-x = 2 + y$

5. $x + y = 4$
   $-x + y = 4$

6. $3x = y + 1$
   $y = 3x + 1$

7. $2x - y = 4$
   $-4x + 2y = -8$

8. $3x + y = 1$
   $x + y = 1$

9. $-y = x - 7$
   $y + x = -7$

10. $10x - 5y = 3$
    $5x - 10y = 3$

11. $-2x + 3y = 5$
    $x = 2 - y$

12. $4x - 3y = 12$
    $y = \frac{4}{3}x - 4$

13. $2x + 2y = 18$
    $y + x = 9$

14. $3x - 7y = 10$
    $6x - 14y = 20$

15. $2x = 4y - 1$
    $7y = x - 7$

16. $8y = x - 5$
    $y - \frac{1}{8}x = 12$

17. $3x - y = 1$
    $2y = -6x + 5$

18. $9 = 3x - y$
    $x = y + 3$

19. $-2x = y - 5$
    $x - 5 = 2y$

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

Step 3:   Add the new equation 1 to equation 2.

$$
\begin{array}{rrrcl}
 & -60p & - & 80s & = & -\$95.00 \\
+ & 60p & + & 5s & = & \$20.00 \\
\hline
 & & - & 75s & = & -\$75.00 \\
\end{array}
$$

The new equation is $-75s = -\$75.00$.

Step 4:   Solve for s.

$-75s = -\$75.00$

$s = \$1.00$

Now, we know the price of stickers, but the question asked for the price of each pencil.

Step 5:   Substitute the value of s into either equation and solve for p to find the price of each pencil.

$30p + 40s = \$47.50$

$30p + 40\,(\$1.00) = \$47.50$

$30p + \$40.00 = \$47.50$

$30p = \$7.50$

$p = \$0.25$

The cost of each pencil is $0.25.

Use systems of equations to solve the following word problems. (DOK 3)

1. The sum of two numbers is 140 and their difference is 20. What are the two numbers?

2. The sum of two numbers is 126 and their difference is 42. What are the two numbers?

3. Kayla gets paid $6.00 for raking leaves and $8.00 for mowing the lawn of each of the neighbors in her subdivision. This year she mowed the lawns 12 times more than she raked leaves. In total, she made $918.00 for doing both. How many times did she rake the leaves?

4. Prices for the movie are $4.00 for children and $8.00 for adults. The total amount of ticket sales is $1,176. There are 172 tickets sold. How many adults and children buy tickets?

5. A farmer sells a dozen eggs at the market for $2.00 and one of his bags of grain for $5.00. He has sold 5 times as many bags of grain as he has dozens of eggs. By the end of the day, he has made $243.00 worth of sales. How many bags of grain did he sell?

6. Every time Lauren does one of her chores, she gets 15 minutes to talk on the phone. When she does not perform one of her chores, she gets 20 minutes of phone time taken away. This week she has done her chores 5 times more than she has not performed her chores. In total, she has accumulated 165 minutes. How many times has Lauren not performed her chores?

23 Explain why a company has to sell 101 soccer balls before they will make a profit. The cost of producing a soccer ball is modeled by $C = 10x + 1000$, where x is the number of soccer balls made. The soccer balls are sold for \$20.

A If we set this up as a system of equations, we will see that the cost $1000x + 10$ of producing x soccer balls is equivalent to the sales price \$20 of x soccer balls when 100 soccer balls are produced and sold. It is on the 101st soccer ball sold that the company will make a profit.

B If we set this up as a system of equations, we will see that the cost $10x + 1020$ of producing x soccer balls is largest when 100 soccer balls are produced and sold. Therefore, the most money will be made when 100 soccer balls are sold.

C If we set this up as a system of equations, we will see that the cost $-10x + 1000$ of producing x soccer balls is equivalent to the sales price of x soccer balls when 100 soccer balls are produced and sold. Therefore, the company will profit on the first 100 soccer balls it produces.

D If we set this up as a system of equations, we will see that the cost $10x + 1000$ of producing x soccer balls is equivalent to the sales price \$20x of x soccer balls when 100 soccer balls are produced and sold. It is on the 101st soccer ball sold that the company will make a profit.

A-REI.11 DOK 3

24 Simplify: $\sqrt[3]{40x^6y}$

A $8x^2\sqrt[3]{5y}$

B $\sqrt[3]{8x^6y} \times \sqrt[3]{5x^6y}$

C $2x^2\sqrt[3]{5y}$

D You cannot take the cube root of a variable.

N-RN.2 DOK 2

25 What is the first step that should be used in order to isolate the variable and maintain a balanced equation for the following?

$$7x + 9 = 23$$
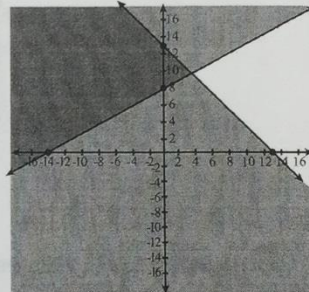
A $\dfrac{7x + 9}{7} = \dfrac{23}{7}$

B $7x + 9 - 9 = 23 - 9$

C $7x + 9 + 9 = 23 + 9$

D $7x + 9 - 7 = 23 - 7$

A-REI.1 DOK 1

26 Find the system of inequalities that models the shaded region.

A $x + y \le 6$, $x \ge 0$, $y \ge 0$

B $x + y \le 13$, $-4x + 7y \ge 56$

C $y \ge 0$, $2x + 2y \le 310$

D $x + 6y \le 9$, $20x + 34y \ge 240$

A-REI.12 DOK 2

27 What is the interval for which this function is decreasing?

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

A $(-\infty, 0)$

B $(-\infty, \infty)$

C $(-\infty, 0]$

D This function is never decreasing.
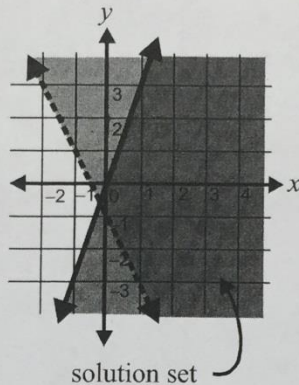
F-IF.4 DOK 2

6

11.8   Graphing Systems of Inequalities (DOK 2)

Systems of inequalities are best solved graphically. Look at the following example.

Example 11:   Sketch the solution set of the following system of inequalities:

$$y > -2x - 1 \text{ and } y \leq 3x$$

solution set

Step 1:   Graph both inequalities on a Cartesian plane. Study the chapter on graphing inequalities if you need to review.

Step 2:   Shade the portion of the graph that represents the solution set to each inequality just as you did in the chapter on graphing inequalities.

Step 3:   Any shaded region that overlaps is the solution set of both inequalities.

Graph the following systems of inequalities on your own graph paper. Shade and identify the solution set for both inequalities. (DOK 2)

1. $9y \leq 6x + 18$
    $-4x - 4y \geq 8$

2. $14x + 14y > 42$
    $8x \geq 24 + 12y$

3. $x + y > -3$
    $-6x + 12y < -12$

4. $x - y \geq 2$
    $2y \leq -4x + 4$

5. $4x > 3y - 12$
    $-\frac{2}{3}x \geq y - 2$

6. $2y < -6x + 4$
    $y - 2x < -2$

7. $y < \frac{1}{3}x - 1$
    $-3x < y - 3$

8. $-2x + y > 2$
    $y \leq -x - 3$

9. $y + \frac{2}{3}x \geq 3$
    $y - 2 < 2x$

10. $y + \frac{3}{2}x \geq -3$
     $x + y \geq -2$

11. $y \leq x - 2$
     $y \leq -x - 3$

12. $y - 2x \leq -1$
     $y + 2 > -x$