

Name: SINGLETON

My Test is On: \_\_\_\_\_

## Unit 2: Equations and Inequalities STUDY GUIDE

1. The
- $\sqrt{33}$
- is between what two numbers?

$$\sqrt{25} \\ \downarrow \\ 5$$

$$\sqrt{36} \\ \downarrow \\ 6$$

Between  
5 and 6

2. Solve for x.

$$-8(5 + x) = -2x + 14$$

$$-40 - 8x = -2x + 14$$

$$\begin{array}{r} +2x \quad +2x \\ -40 - 6x = 14 \\ +40 \quad +40 \\ -6x = 54 \end{array}$$

$$\begin{array}{r} -6x = 54 \\ \div 6 \quad \div 6 \\ x = -9 \end{array}$$

3. What value of x satisfies the equation?

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

$$4x - 8 - 3x - 6 = 2$$

$$x - 14 = 2$$

$$x = 16$$

4. Explain why 7 is the best whole number estimate of
- $\sqrt{51}$
- .

51 sits between 49 and 64 but is closer to 49

$$\sqrt{49} = 7 \quad \sqrt{64} = 8$$

closer

5. What is the solution to the inequality?

$$2x + 7 > -11$$

$$\begin{array}{r} -7 \quad -7 \\ 2x > -18 \end{array}$$

$$\frac{2x}{2} > \frac{-18}{2}$$

$$x > -9$$

6. Simplify
- $\sqrt[3]{64}$
- .

$$4$$

7. Morgan already has the following test scores: 98, 87, 93, and 91. If she wants her test average to be a 93, what score must she earn on her next test?

$$\frac{98 + 87 + 93 + 91 + x}{5} = 93$$

$$96$$

$$369 + x = 465$$

$$\begin{array}{r} 369 + x = 465 \\ -369 \quad -369 \\ x = 96 \end{array}$$

$$x = 96$$

8. Represent the following statement:

Mult.  $=$  +  
Six times a number x is 9 more than x

$$6x = 9 + x$$

9. The length of a rectangular garden is twice its width, w. The perimeter of the garden is 96 feet. What is the length of the garden?

$$w = \text{width}$$

$$2w = \text{length}$$

$$\begin{array}{c} 2w \\ w \end{array}$$

$$\frac{6w}{6} = \frac{96}{6} \quad w = 16 \text{ ft}$$

plug 16 into 2w for length

$$2w = 2(16) = 32 \text{ ft}$$

10. If 21 more than 3 times a number is -24, what is the number? Write and solve an equation to find the number.

$$x = \text{the number}$$

$$21 + 3x = -24$$

$$\begin{array}{r} 21 + 3x = -24 \\ -21 \quad -21 \\ 3x = -45 \end{array}$$

$$\frac{3x}{3} = \frac{-45}{3}$$

$$x = -15$$

11. If
- $x^3 = 27$
- and
- $y^3 = 216$
- , what is the value of
- $x - y$
- ?

$$x^3 = 27$$

$$y^3 = 216$$

$$x = 3$$

$$y = 6$$

$$x - y$$

$$3 - 6$$

$$-3$$

Take the cube root of each to solve for the variables

12. Bunn's Cakes charges \$4 per person and a \$25 set-up fee to design a cake. Write an equation to find the number of guests (x) that could eat cake at the party if they have a budget of \$1,429 for cake.

$$x = \text{number of guests}$$

$$\begin{array}{r} 4x + 25 = 1429 \\ -25 \quad -25 \\ 4x = 1404 \\ \div 4 \quad \div 4 \\ x = 351 \end{array}$$

$$351 \text{ guests}$$

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13. Joe is saving to buy a television that costs \$1150. Joe currently has \$175 saved. He plans to save an additional \$75 each week. How many weeks will it take Joe to have \$1150 saved?

$x = \#$  of weeks

$$\begin{array}{r} 75x + 175 = 1150 \\ -175 \quad -175 \\ \hline 75x = 975 \\ \underline{75} \quad \underline{75} \\ x = 13 \end{array}$$

13 weeks

14. The sum of three consecutive even integers is -66. What is the value of the smallest of the three integers? Set up and solve an equation to find your answer.

$x = \text{smallest \#}$   
 $x+2 = \text{middle \#}$   
 $x+4 = \text{largest \#}$

$$(x) + (x+2) + (x+4) = -66$$

$$3x + 6 = -66$$

$$\begin{array}{r} -6 \quad -6 \\ \hline 3x = -72 \end{array}$$

$$\begin{array}{r} 3x = -72 \\ \underline{3} \quad \underline{3} \\ x = -24 \end{array}$$

$$x = -24$$

Smallest # is 20

15. What is the solution to the inequality?

$$-4(2x + 3) - 10x > 14(x - 8) + 3x$$

$$\begin{array}{r} -8x - 12 - 10x > 14x - 112 + 3x \\ \hline -18x - 12 > 17x - 112 \end{array}$$

$$\begin{array}{r} -18x - 12 > 17x - 112 \\ -17x \quad -17x \\ \hline -35x - 12 > -112 \end{array}$$

$$\begin{array}{r} -35x - 12 > -112 \\ +12 \quad +12 \\ \hline -35x > -100 \end{array}$$

$$\begin{array}{r} -35x > -100 \\ \underline{-35} \quad \underline{-35} \\ x < \frac{20}{7} \end{array}$$

$$x < \frac{20}{7}$$

16. Suzie's test scores are 90, 93, 85, 87, and 88. What is the lowest she can score on the next test to achieve an average of at least a 90?

$$\frac{90 + 93 + 85 + 87 + 88 + x}{6} \geq 90$$

$$\frac{443 + x}{6} \geq 90(6)$$

$$\begin{array}{r} 443 + x \geq 540 \\ -443 \quad -443 \\ \hline x \geq 97 \end{array}$$

$$x \geq 97$$

At least 97%

17. Which of the following equations gives a solution of "no solution?"

A.  $3(x + 3) = 9$   $\begin{array}{r} 3x + 9 = 9 \\ -9 \quad -9 \\ \hline 3x = 0 \end{array} x = 0$

B.  $\begin{array}{r} -2x + 7 = -2x + 14 \\ +2x \quad +2x \\ \hline 7 = 14 \end{array}$

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

D.  $\begin{array}{r} x - 3 = x - 3 \\ -x \quad -x \\ \hline -3 = -3 \end{array}$

18. Which of the following equations gives a solution of "all real numbers?"

A.  $3(x + 3) = 9$   $\begin{array}{r} 3x + 9 = 9 \\ -9 \quad -9 \\ \hline 3x = 0 \end{array} x = 0$

B.  $-2x + 7 = -2x + 14$

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

D.  $x - 3 = x - 3$

19. Solve:

$$\frac{6}{10}x + \frac{2}{5} = \frac{1}{2}x - \frac{3}{5}$$

$$\begin{array}{r} 6x + 4 = 5x - 6 \\ -5x \quad -5x \\ \hline x + 4 = -6 \end{array}$$

$$\begin{array}{r} x + 4 = -6 \\ -4 \quad -4 \\ \hline x = -10 \end{array}$$

$$x = -10$$

20. Translate to an equation and solve to find three consecutive integers whose sum is -54.

$$x = 1^{\text{st}} \# -19$$

$$x+1 = 2^{\text{nd}} \# -18$$

$$x+2 = 3^{\text{rd}} \# -17$$

$$(x) + (x+1) + (x+2) = -54$$

$$3x + 3 = -54$$

$$\begin{array}{r} -3 \quad -3 \\ \hline 3x = -57 \end{array}$$

$$\begin{array}{r} 3x = -57 \\ \underline{3} \quad \underline{3} \\ x = -19 \end{array}$$

-19, -18, -17

## Unit 2: Equations and Inequalities STUDY GUIDE

21. If the sum of three consecutive odd integers is at most 165, what is the largest of these three integers? Set up and solve equation.

$$\begin{aligned}
 x &= 1^{\text{st}} \# \quad 53 & (x) + (x+2) + (x+4) &\leq 165 \\
 x+2 &= 2^{\text{nd}} \# \quad 55 & 3x + 6 &\leq 165 \\
 x+4 &= 3^{\text{rd}} \# \quad 57 & \begin{array}{r} -6 \quad -6 \\ 3x \leq 159 \\ \hline 3 \quad 3 \\ x \leq 53 \end{array}
 \end{aligned}$$

The largest is 57.

22. The length of a rectangle is 3 more than twice its width. Its perimeter is 60 ft. Find its dimensions.

Draw or use  $P = 2L + 2W$

$$\begin{aligned}
 w &= \text{width} \\
 3+2w &= \text{length} \\
 \begin{array}{c} w \\ \boxed{3+2w} \end{array}
 \end{aligned}$$

$$\begin{aligned}
 6w + 6 &= 60 \\
 -6 \quad -6 \\
 \hline
 6w &= 54 \\
 \hline
 w &= 9
 \end{aligned}$$

width = 9 ft  
length = 21 ft

$$\begin{aligned}
 \text{Length} \\
 3+2w \\
 3+2(9) \\
 3+18 \\
 21
 \end{aligned}$$

Make sure to label your answers and use the correct units.

23.

A. Solve the inequality:  $6r - (3r + 2) \geq -35$

B. Name three possible solutions to the inequality.

$$\begin{aligned}
 6r - (3r + 2) &\geq -35 \\
 6r - 3r - 2 &\geq -35 \\
 3r - 2 &\geq -35 \\
 +2 \quad +2 \\
 \hline
 3r &\geq -33 \\
 \hline
 r &\geq -11
 \end{aligned}$$

Possible solutions  
-11, -8, 0

24. The equation below is used to find C, the total cost for printing a quantity of books, b.

$$C = 3b + 150$$

Write an equivalent equation that is solved for b in terms of C.

$$\begin{aligned}
 C &= 3b + 150 \\
 -150 \quad -150 \\
 \hline
 C - 150 &= 3b \\
 \hline
 \frac{C - 150}{3} &= \frac{3b}{3} \\
 b &= \frac{C - 150}{3}
 \end{aligned}$$

25. Solve for h if  $A = \frac{1}{2}bh$ .

$$(2) A = \frac{1}{2}bh$$

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

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

26. Solve the following equation for y:

$$\begin{aligned}
 3x - 4y &= 12 \\
 -3x \quad -3x \\
 \hline
 -4y &= -3x + 12 \\
 \div 4 \quad \div 4 \quad \div 4 \\
 \hline
 y &= \frac{3}{4}x - 3
 \end{aligned}$$

27. The total number of students who could attend a field trip is represented by the variable t. The number of students in Group A is greater than the number of students in Group B. Group A has 3 students more than  $\frac{2}{3}$  the total number of students. Group B has 4 less than the total number of students. Write an inequality to represent this situation. DO NOT SOLVE.

t = total students

$$3 + \frac{2}{3}t > t - 4$$