

SINGLETON

Name _____ Block _____ Date _____

Unit 1: Expressions, Equations, and Inequalities STUDY GUIDE

SEM. SPRING 2019

<p>1. Which of the following does not result in a solution of $x = 5$?</p> <p>A. $52 = 4x + 7x - 8 + x$</p> <p>B. $5 + 2(3x + 4) = 43$</p> <p>C. $2(4x - 12) + 3x = 6x + 1$</p> <p>D. $2(4x + 7) = 2x + 4$</p> <p style="text-align: right; font-weight: bold;">ON PAPER</p>	<p>2. Solve for x.</p> $9x - 2(4x + 5) = 2x - (4 - x) - 12$ $\underline{9x} - \underline{8x} - 10 = \underline{2x} - \underline{4} + \underline{x} - \underline{12}$ $\underline{x} - 10 = \underline{3x} - 16$ $\underline{-3x} \quad \underline{-3x}$ $\underline{-2x - 10 = -16}$ $\quad \underline{+10} \quad \underline{+10}$ $\underline{-2x = -6}$ $\underline{-2} \quad \underline{-2}$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">$x = 3$</div>
<p>3. The Independence Football team is buying jackets. The jackets will cost \$30 each plus a one-time fee of \$18 for the design on the jacket. The total number can be at most \$2,238. The inequality $30x + 18 \leq 2,238$ can be solved to determine x, the number of jackets that can be purchased. Write and solve an inequality that represents the solution.</p> $\underline{30x + 18 \leq 2238}$ $\underline{-18} \quad \underline{-18}$ $\underline{30x \leq 2220}$ $\underline{30} \quad \underline{30}$ $x \leq 74$ <p style="text-align: center;">jackets</p>	<p>4. What is the solution to the inequality?</p> $\underline{-1} - 6x - \underline{6} > -11 - 7x$ $\underline{-7} - 6x > -11 - 7x$ $\quad \underline{+7x} \quad \underline{+7x}$ $\underline{-7 + x > -11}$ $\quad \underline{+7} \quad \underline{+7}$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">$x > -4$</div>
<p>5. Write an equation that can be used to solve this problem, do not simplify. The sum of two consecutive even integers is 56.</p> <p>X X + X + 2 = 56</p> <p>X + 2</p> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">$2x + 2 = 56$</div>	<p>6. 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?</p> $\frac{369 + x}{5} = 93$ $369 + x = 465$ $x = 96$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">96%</div>
<p>7. A company uses the formula $T = 31c + 1,513p$ to determine the total cost to purchase c cases and p phones. Write a formula that can be used to determine the total number of phones purchased, given the total cost, T, and the number of cases purchased.</p> $\underline{T = 31c + 1513p}$ $\underline{-31c} \quad \underline{-31c}$ $\underline{T - 31c = 1513p}$ $\underline{T - 31c} = \underline{1513p}$ $\underline{1513} \quad \underline{1513}$ $p = \frac{T - 31c}{1513}$	<p>8. If 21 more than 3 times a number is -24, what is the number? Write and solve an equation to find the number.</p> $\underline{21 + 3x = -24}$ $\underline{-21} \quad \underline{-21}$ $\underline{3x = -45}$ $\underline{3} \quad \underline{3}$ $x = -15$ <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 100px;">$x = -15$</div>
<p>9. The width of a rectangle is $\frac{3}{4}$ its length. The perimeter of the rectangle is 245 feet. What is the length, in feet, of the rectangle?</p> <p>X = length $\frac{7}{2}x = 245$</p> <p>$\frac{3}{4}x =$ width</p> $x = 70$	<p>10. 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.</p> $4x + 25 = 1429$



11. Keyshawn and Trey begin saving money each week. After x weeks, the following functions represent the amount of money they have saved.

Keyshawn	$f(x) = 5x + 36$
Trey	$g(x) = 8x + 9$

After how many weeks will they have the same amount of money? **ON PAPER**
9 WKS.

12. The sum of three consecutive even integers is -66. What is the value of the smallest of the three integers?

$$\begin{aligned} x + x + 2 + x + 4 &= -66 \\ 3x + 6 &= -66 \\ \underline{-6 \quad -6} & \\ 3x &= -72 \\ \underline{\quad \quad 3} & \\ x &= -24 \end{aligned}$$

-24 is the smallest

-24, -22, -20

13. Solve the inequality:

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

ON PAPER

14. 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?

$$\begin{aligned} (6) \frac{443 + x}{6} &\geq 90(6) \\ 443 + x &\geq 540 \\ \underline{-443 \quad -443} & \\ x &\geq 97 \end{aligned}$$

97%

x ≥ 97

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

A. $3(x + 3) = 9$

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

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

D. $x - 3 = x - 3$

ON PAPER

16. The expression $35n + 14f + 6p + 18d$ represents the cost, in dollars, to purchase n cases of paper, f packages of file folders, p packs of pencils, and d flash drive. What is represented by each of the following parts of the expression?

$35n$ cost of cases of paper that are \$35 each

14 → cost per pack of file folders

$6p$ → cost of packs of pencils that are \$6 each

d → # of flash drives

17. The length of a rectangle is 8 inches more than the width. The perimeter is 80 inches. Find the **area** of the rectangle.

ON PAPER

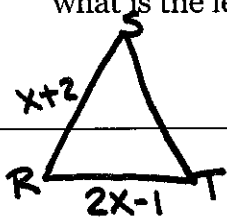
18. Five less than the quotient of a number and 3 is -7 . What is half the number?

$$\begin{aligned} \frac{x}{3} - 5 &= -7 \\ \underline{+5 \quad +5} & \\ (3) \frac{x}{3} &= -2(3) \end{aligned}$$

$x = -6$

Half → -3

19. The perimeter of triangle RST is $6x - 7$. If side length RS is $x + 2$ and RT is $2x - 1$, what is the length of side ST?



$$(6x - 7) - (3x + 1)$$

3x - 8

$$\begin{aligned} x + 2 + 2x - 1 \\ 3x + 1 \end{aligned}$$

20. Tory and Samuel purchased pencils. Tory purchased 4 times as many pencils than Samuel. If they purchased 35 total pencils, how many pencils did Tory purchase?

$x =$ Samuel's pencils

$4x =$ Tory's pencils

$$x + 4x = 35$$

$$\frac{5x}{5} = \frac{35}{5}$$

$x = 7$ ← Samuel's pencils

4(7) = 28 Pencils

① A. $52 = 4x + 7x - 8 + x$

$$\begin{array}{r} 52 = 12x - 8 \\ + 8 \qquad + 8 \\ \hline 60 = 12x \\ \frac{60}{12} = \frac{12x}{12} \\ \boxed{x = 5} \end{array}$$

B. $5 + 2(3x + 4) = 43$

$$\begin{array}{r} 5 + 6x + 8 = 43 \\ \underline{-13 \quad -13} \\ 13 + 6x = 43 \\ \underline{-13 \quad -13} \\ 6x = 30 \\ \frac{6x}{6} = \frac{30}{6} \\ \boxed{x = 5} \end{array}$$

C. $2(4x - 12) + 3x = 6x + 1$

$$\begin{array}{r} 8x - 24 + 3x = 6x + 1 \\ \underline{-6x \quad -6x} \\ 11x - 24 = 6x + 1 \\ \underline{-6x \quad -6x} \\ 5x - 24 = 1 \\ \underline{+24 \quad +24} \\ 5x = 25 \\ \frac{5x}{5} = \frac{25}{5} \quad \boxed{x = 5} \end{array}$$

D. $2(4x + 7) = 2x + 4$

$$\begin{array}{r} 8x + 14 = 2x + 4 \\ \underline{-2x \quad -2x} \\ 6x + 14 = 4 \\ \underline{-14 \quad -14} \\ 6x = -10 \\ \frac{6x}{6} = \frac{-10}{6} \\ \boxed{x = -\frac{5}{3}} \end{array}$$

⑪ $5x + 36 = 8x + 9$

$$\begin{array}{r} 5x + 36 = 8x + 9 \\ \underline{-8x \quad -8x} \\ -3x + 36 = 9 \\ \underline{-36 \quad -36} \\ -3x = -27 \\ \underline{-3 \quad -3} \\ x = 9 \end{array}$$

⑬

$$\begin{array}{r} -4(2x + 3) - 10x > 14(x - 8) \\ \underline{+3x} \\ -8x - 12 - 10x > 14x - 112 + 3x \\ \underline{-17x \quad -17x} \\ -18x - 12 > 17x - 112 \\ \underline{-17x \quad -17x} \\ -35x - 12 > -112 \\ \underline{+12 \quad +12} \\ -35x > -100 \\ \underline{-35 \quad -35} \\ x < \frac{20}{7} \end{array}$$

⑤ A. $3(x + 3) = 9$

$$\begin{array}{r} 3x + 9 = 9 \\ \underline{-9 \quad -9} \\ 3x = 0 \\ \frac{3x}{3} = \frac{0}{3} \\ \boxed{x = 0} \end{array}$$

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

$$\begin{array}{r} -2x + 7 = -2x + 14 \\ \underline{+2x \quad +2x} \\ 7 = 14 \\ \boxed{\emptyset} \end{array}$$

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

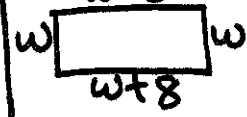
$$\begin{array}{r} 4x + 3 = -4x + 3 \\ \underline{+4x \quad +4x} \\ 8x + 3 = 3 \\ \underline{-3 \quad -3} \\ 8x = 0 \\ \frac{8x}{8} = \frac{0}{8} \\ \boxed{x = 0} \end{array}$$

D. $x - 3 = x - 3$

$$\begin{array}{r} x - 3 = x - 3 \\ \underline{-x \quad -x} \\ -3 = -3 \\ \boxed{\infty} \end{array}$$

⑰ $w = \text{width}$

$w + 8 = \text{length}$



$$\begin{array}{r} 4w + 16 = 80 \\ \underline{-16 \quad -16} \\ 4w = 64 \\ w = 16 \\ w + 8 = 24 \end{array}$$

Area = lw

24(16)

$A = 384 \text{ in}^2$

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21. If $3(p - 3) - 5p < -3p - 6$ and p is an integer, what is the greatest possible value of $p + 3$?

Greatest p is 2 so $p + 3 = 5$

$$\begin{array}{r} 3p - 9 - 5p < -3p - 6 \\ -2p - 9 < -3p - 6 \\ +3p \quad +3p \\ \hline p - 9 < -6 \quad p < 3 \end{array}$$

22. Solve:

$$\begin{array}{r} (10) \frac{6}{10}x + \frac{2}{5} = \frac{1}{2}x - \frac{3}{5} \\ 6x + 4 = 5x - 6 \\ -5x \quad -5x \\ \hline x + 4 = -6 \\ \hline x = -10 \end{array}$$

23. Simplify the expression using the correct order of operations.

$$5 + 6(3^3 - 15)^2$$

$$5 + 6(27 - 15)^2$$

$$5 + 6(12)^2$$

$$5 + 6(144)$$

$$5 + 864$$

869

24. What are the terms, variables, constants, and coefficients of the expression below?

$$2xy^3 + 5 - x^2y$$

Terms: $2xy^3, 5, -x^2y$

Variables: x, y

Coefficients: $2, -1$

Constants: 5

25. The side lengths of triangle KMN are three consecutive odd integers. The perimeter of the triangle 165cm. What is the length of the longest side?

$x = 1^{st}$
 $x + 2 = 2^{nd}$
 $x + 4 = 3^{rd}$

$$x + x + 2 + x + 4 = 165$$

$$3x + 6 = 165$$

$$3x = 159$$

$$x = 53$$

53, 55, 57

57 longest side

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

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

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

27. Solve for h $V = \frac{1}{3}Bh$

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

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

28. In the inequality $3x - 8 > 16$ which phrase accurately and completely describes x ?

A. At most 8
B. Exactly 8
C. Less than 8
D. More than 8

$$\begin{array}{r} 3x - 8 > 16 \\ +8 \quad +8 \\ \hline 3x > 24 \\ \frac{3x}{3} > \frac{24}{3} \\ \hline x > 8 \end{array}$$

30. Marissa plans to create silk floral arrangements. The expression $13v + 8f + 6b + 3m$ represents her cost in dollars, for the arrangements when she buys v vases, f stems of flowers, b stems of wood bark, and m packages of marbles. What does the term $13v$ represent?

$13v$ represents the total cost of v vases which cost \$13 each