

Equations Study Guide

Name: Key

Solve each of the following questions below. Be sure to show ALL work algebraically & neatly. Write your final answer in the blank provided.

1. Solve for x. $21 \left(\frac{2}{3}x + 5 \right) = \left(\frac{5}{7}x - 2 \right) 21$

$$14x + 21(5) = 15x - 2(21)$$

$$105 = x - 42$$

$$\begin{array}{r} 105 \\ + 42 \\ \hline 147 = x \end{array}$$

1. $x = 147$

2. Solve for x. $\frac{a}{b}x - c = w$

$$\begin{array}{r} \frac{a}{b}x - c \\ + c \quad + c \\ \hline \end{array}$$

$\frac{a}{b} \cdot \frac{b}{a} x = (w+c) \frac{b}{a}$

must have parentheses!

2. $x = \frac{b}{a}(w+c)$

3. Solve for x. $6 - 3(2x - 5) = \frac{-1}{3}(18x + 6) - 5$

$$6 - 6x + 15 = -6x - 2 - 5$$

$$-6x + 21 = -6x - 7$$

same coefficients
diff constants
 $21 \neq -7$ false!

3. \emptyset

4. Solve for x. $-\frac{3}{4} = \frac{x-5}{2x+7}$

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

$$-6x - 21 = 4x - 20$$

$$\frac{-1}{10} = \frac{10x}{10}$$

$$-1/10 = x$$

4. $x = -1/10$

5. Solve for m. $x = \frac{m}{n} + p$

$$\begin{array}{r} x - p \\ -p \quad -p \\ \hline \end{array}$$

$$n(x-p) = \frac{m}{n} \times n$$

$$n(x-p) = m$$

5. $m = n(x-p)$

6. Solve for C. $\frac{9}{5} \cdot F = \frac{5}{9} (C - 32) \times \frac{9}{5}$

$$\begin{aligned} \frac{9}{5} F &= C - 32 \\ &+ 32 \\ \frac{9}{5} F + 32 &= C \end{aligned}$$

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

7. Solve for x. $3x + 4(6 - x) = 9(23 + 2x) - 10$

$$3x + 24 - 4x = 207 + 18x - 10$$

$$-x + 24 = 18x + 197$$

$$\frac{-173}{19} = \frac{19x}{19}$$

$$\boxed{\frac{-173}{19} = x}$$

7. $x = \frac{-173}{19}$

8. The side length of a square measures $3x + 2$ and the side lengths of a triangle are x , x , and $2x + 16$. If the square and the triangle have the SAME perimeter, find the perimeter.

Equation: $4(3x + 2) = x + x + 2x + 16$

$$12x + 8 = 4x + 16$$

$$8x = 8$$

$$x = 1$$

$$P = 4(3x + 2) = 4(3(1) + 2) = 20$$

8. 20 un

9. Find three consecutive odd integers such that twice the largest, minus the middle, is the same as 3 less than four times the smallest.

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

↑ parentheses!

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

$$\underline{x} \quad \underline{x+2} \quad \underline{x+4}$$

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

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

$$9 = 3x$$

$$3 = x$$

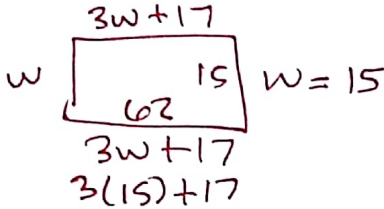
9. 3, 5, 7

10. The perimeter of a rectangle is 154 inches. If the length of the rectangle is 17 inches greater than three times the width, find the AREA of the rectangle in square inches.

$l \rightarrow w$

Equation: $2(3w+17+w) = 154$

Let $w =$ the width.



$P = 154$

$A = lw = 62 \cdot 15 = 930$

$2(3w+17+w) = 154$

$2(4w+17) = 154$

$8w + 34 = 154$

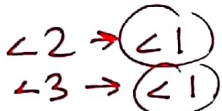
$8w = 120$

$w = 15$

10. $A = 930 \text{ in}^2$

11. A triangle's second angle is half the first. The third angle is 9 less than twice the first. What are the measures of the three angles?

Equation: $x + \frac{1}{2}x + 2x - 9 = 180$



$3\frac{1}{2}x - 9 = 180$

Let $x = m\angle 1$. $\frac{2}{7}x + \frac{7}{2}x = 189 \cdot \frac{2}{7}$

$x = 54$

11. $m\angle 1 = 54^\circ$

$m\angle 2 = 27^\circ$

$m\angle 3 = 99^\circ$

12. Show two different ways to solve this equation:

Distribute:

$12 = -4(x+5) + 8$

$12 = -4x - 20 + 8$

$12 = -4x - 12$

$24 = -4x$

$-6 = x$

$12 = -4(x+5) + 8$

Divide:

$12 = -4(x+5) + 8$

$-4 \quad -4$

$-3 = x + 5 - 2$

$-3 = x + 3$

$-3 \quad -3$

$-6 = x$

12. $x = -6$