

1. Simplify each of the following.

$$(a) \frac{2}{3} - \frac{3}{5} \left(-\frac{1}{3}\right)^2 = \frac{3}{5}$$

$$(b) ||2 - 3^3| - 4^2| = 9$$

$$(c) -|-5| = -5$$

2. Evaluate $15 - |-x - x^2 + 5|$ if

$$(a) x = 0 \quad 10$$

$$(b) x = 2 \quad 14$$

$$(c) x = -2 \quad 12$$

$$(d) x = \frac{1}{2} \quad \frac{43}{4}$$

3. Simplify each of the following algebraic expressions.

$$(a) (a - 2b) + (a + 5b) = 2a + 3b$$

$$(b) (a - 2b) - (a + 5b) = -7b$$

$$(c) (a + 5b) - (a - 2b) = 7b$$

$$(d) 2(a - 2b) - 3(a + 5b) = -a - 19b$$

$$(e) 2(a + 5b) - 3(a - 2b) = -a + 16b$$

4. Solve each of the following equations. Make sure to check your solutions.

$$(a) \frac{3x - 1}{5} - \frac{2x - 5}{3} = x - 6 \quad 7$$

$$(b) \frac{2x - 7}{3} = -1 \quad 2$$

$$(c) 5(x - 2) - 2(3x - 1) = -3x - 8 \quad 0$$

$$(d) 3(x - 4) - (2 - 2x) = 5x + 14 \quad \text{no solution}$$

$$(e) 2(4 - x) - 5(2x - 1) = -13(x - 1) + x \quad \text{identity, all numbers are solution}$$

$$(f) \frac{1}{5}x - \frac{2}{3} = \frac{26}{15} \quad 12$$

5. Solve each of the following inequalities.

$$(a) 2a - 5 \geq -7 \quad a \geq -1$$

$$(b) -2a + 15 < -19 \quad a > 17$$

6. Solve each of the following formulas.

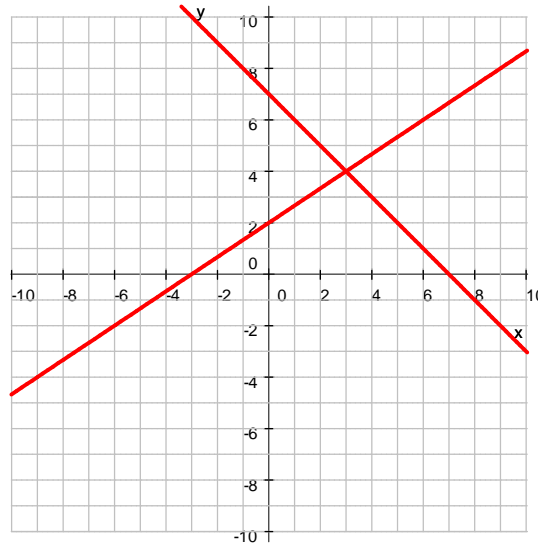
- (a) $P = 2a + 2b$ for b $b = \frac{P - 2a}{2}$ or $y = \frac{1}{2}P - a$ or $y = \frac{P}{2} - a$
- (b) $2x + 3y = -6$ for y $y = \frac{-2x - 6}{3}$ or $y = -\frac{2}{3}x - 2$ or $y = -\frac{2x}{3} - 2$
- (c) $3x - 4y = 24$ for y $y = \frac{3x - 24}{4}$ or $y = \frac{3}{4}x - 6$ or $y = \frac{3x}{4} - 6$

7. Word Problems.

- (a) One side of a rectangle is 5 in shorter than seven times another side. Find the sides if the perimeter of the rectangle is 166 in. **11 in by 72 in**
- (b) The sum of two numbers is 23, their difference is 41. Find these numbers. **-9 and 32**
- (c) The sum of three consecutive numbers is 51. Find these numbers. **16, 17, and 18**
- (d) Ann took four exams. Her scores on the first three exams were 63, 76, and 68. How many points did she earn on the fourth exam if her average is 71? **77**

8. Consider the equations $2x - 3y = -6$ and $y = -x + 7$.

- (a) Graph these lines in the same coordinate system. Use your graph to find the coordinates where the points intersect. **(3, 4)**



- (b) Use algebraic methods to check your answer for part a).

Solution: Is the point (3, 4) on the line $2x - 3y = -6$?

$$\text{LHS} = 2x - 3y = 2(3) - 3(4) = 6 - 12 = -6 = \text{RHS} \implies \text{yes}$$

Is the point (3, 4) on the line $y = -x + 7$?

$$\begin{aligned} \text{LHS} &= y = 4 \\ \text{RHS} - x + 7 &= -3 + 7 = 4 = \text{LHS} \implies \text{yes} \end{aligned}$$