

3-8 Solving Literal Equations

Solve literal equations **THE SAME** way you solve regular equations. Use **REVERSE Order of Operations**.

Examples:

- a) Solve $y = mx + b$ for 'b' (Get **b** by itself)

To get 'b' by itself, we need to move 'mx' to the other side of the equation. To do that, perform the inverse operation, which in this case is subtraction.

$$\begin{array}{r} y = mx + b \\ -mx \quad | \quad -mx \\ \hline y - mx = b \end{array}$$

Our answer is:

$$\mathbf{b = y - mx}$$

- b) Solve $y = mx + b$ for 'x' (Get **x** by itself)

To get 'x' by itself, we need to move 'b' and 'm' to the other side of the equation. Since we're using REVERSE Order of Operations, we'll deal with the 'b' first. Perform the inverse operation and subtract it from both sides

$$\begin{array}{r} y = mx + b \\ -b \quad | \quad -b \\ \hline y - b = mx \end{array}$$

Next, we need to move the 'm.' Since it is being multiplied with the x, perform the inverse operation and DIVIDE both sides by 'm.'

$$\frac{y - b}{m} = \frac{mx}{m}$$

Our answer is:

$$\frac{\mathbf{y - b}}{\mathbf{m}} = \mathbf{x}$$

- c) Solve $e = mc^2$ for 'c' (Get **c** by itself)

To get 'c²' by itself, perform the inverse operation and DIVIDE both sides by 'm.'

$$\frac{e}{m} = \frac{mc^2}{m}$$

$$\frac{e}{m} = c^2$$

Next, we need to remove the ² from 'c².' The opposite of squaring something is to take the square root of it.

$$\sqrt{\frac{e}{m}} = \sqrt{c^2}$$

Our answer is:

$$\sqrt{\frac{e}{m}} = c$$

d) Solve $a = \frac{3}{4}(b - 5)$ for 'b' (Get **b** by itself)

To get 'b' by itself, we need to move ' $\frac{3}{4}$ ' to the other side of the equation. To do that, multiply by the reciprocal.

$$\frac{4}{3} \circ a = \cancel{\frac{4}{3}} \circ \frac{3}{4} (b - 5)$$

$$\frac{4}{3} \circ a = b - 5$$

Next, get rid of the '5' by adding it to both sides.

$$\frac{4}{3} \circ a = b - \cancel{5}$$

$$+5 \quad +5$$

Our answer is:

$$\mathbf{b = \frac{4}{3} a + 5}$$