

2 2-Step Algebra

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Math 9 Ch 6 Level 2: 2-Step Algebra

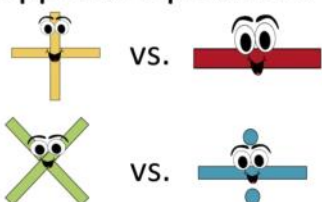
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What are the steps to gift-wrap the monkey using the box and ribbon?



To get the monkey out, you have to do the opposite operations in reverse order!

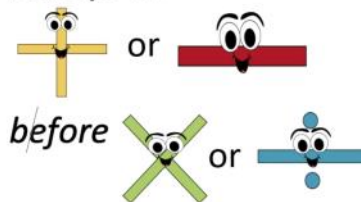
Opposite Operations



Do the *same*
thing on *each*
side of



Always do



Examples:

1) $3x + 2 = 11$

$$\begin{array}{r} -2 \quad -2 \\ 3x + 2 = 11 \\ \hline 3x = 9 \\ \hline \frac{3x}{3} = \frac{9}{3} \\ x = 3 \end{array}$$

2) $4x - 3 = 18$

$$\begin{array}{r} +3 \quad +3 \\ 4x - 3 = 18 \\ \hline 4x = 21 \\ \hline \frac{4x}{4} = \frac{21}{4} \\ x = 5.25 \end{array}$$

3) $\frac{x}{3} - 2 = -6$

$$\begin{array}{r} +2 \quad +2 \\ \frac{x}{3} - 2 = -6 \\ \hline \frac{x}{3} = -4 \\ \hline \frac{\cancel{3}x}{\cancel{3}} = -4(3) \\ x = -12 \end{array}$$

4) $3x - 4 - 7 - x = -3$

$$\begin{array}{r} \text{Collect LIKE TERMS!} \\ 3x - x - 4 - 7 = -3 \\ 2x - 11 = -3 \\ \hline +11 \quad +11 \\ 2x = 8 \\ \hline \frac{2x}{2} = \frac{8}{2} \\ x = 4 \end{array}$$

Ex. 5: Solve the equation $-2(x + 4) = 12$ in **TWO different ways** and verify your solution!

Method 1: *distribute*

$$\begin{aligned} -2(x + 4) &= 12 \\ -2(x) + -2(4) &= 12 \\ -2x + (-8) &= 12 \\ -2x + 8 &= 12 \\ -2x &= 20 \\ x &= -10 \end{aligned}$$

Method 2:

$$\begin{aligned} -2(x + 4) &= 12 \\ \cancel{-2} &\quad \cancel{-2} \\ x + 4 &= -6 \\ -4 &\quad -4 \\ \boxed{x = -10} \end{aligned}$$

Ex. 6: $4(x-2) - 8x = -34$

$$\begin{aligned} 4(x) - 8 - 8x &= -34 \\ 4x - 8 - 8x &= -34 \\ -4x - 8 &= -34 \\ +8 &\quad +8 \\ -4x &= -26 \div 2 \\ \cancel{-4} &\quad \cancel{-4} \div 2 \\ \boxed{x = \frac{13}{2}} &= 6.5 \end{aligned}$$

$\ominus \div \ominus = \oplus$

Collect **LIKE** terms before solving

$$3x - 5 + 4x + 9 = 25$$

$$3x + 4x - 5 + 9 = 25$$

$$7x + 4 = 25$$

Ex. 7: **"=**"
If you **triple a number**, then **add fifteen**, the **result is negative twelve**.
What is the number?

a) If x represents the number, write the equation.

$$\begin{aligned} 3x + 15 &= -12 \\ -15 &\quad -15 \\ 3x &= -27 \\ 3 &\quad 3 \\ \boxed{x = -9} \end{aligned}$$

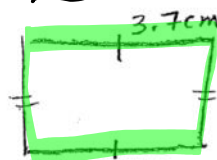
b) Solve the equation.

Check:

$$\begin{aligned} 3(-9) + 15 &= -12 \\ -27 + 15 &= -12 \checkmark \end{aligned}$$

Ex. 8:

If the **perimeter** of this rectangle is **13.2 cm**, what is the width?



$$\begin{aligned} 2(3.7 + x) &= 13.2 \\ \cancel{2} &\quad \cancel{2} \\ 3.7 + x &= 6.6 \\ -3.7 &\quad -3.7 \\ \boxed{x = 2.9} \end{aligned}$$

The width is 2.9 cm.

9, 10, 11

