Important Rules for Solving Equations

- When you solve an equation, your goal is to get the _____ alone by itself on one side of the equation. In other words, you are trying to _____ the variable.

- When you are solving for a variable, you MUST use inverse _____.

- Draw a line to separate both sides of the equation.

Important Rules for Solving Equations (Continued)

- Whatever you do to _____ of an equation, you must do to the _____ side of the equation. In other words, you must keep the equation _____.

Think of solving an equation like lifting weights

- If you add or subtract weight from one side of the barbell, you must _____ or _____ weight from the other side to keep it balanced!

Solve: **r + 16 = -7**

- To solve, you must isolate the variable.

- What number is on the same side as **r**?

- To get **r** by itself, we must undo the addition. What is the opposite of addition?

1. Draw a line to separate the equation into 2 sides.
2. _____ ____ from both sides.
3. Check your answer by substituting your answer back into the problem.

r + 16 = -7

x + 2 = -3

1. Draw a line to separate the equation into 2 sides.
2. _____ ____ from both sides.
3. Check your answer by substituting your answer back into the problem.

Solve: y + (-3) = -8

Check Your Answer:

Solve: x - (-2) = 1

Check Your Answer:

Solve: 3.4 + x = -9.08

Check Your Answer:

Solve: x - (-2.98) = -11.5

Check Your Answer:

Solve: -11 = t + (-2)

Solve: -22 = c - 12

Solve: $x+\left(-\frac{1}{4}\right)=\frac{5}{6}$

Check Your Answer:

Solve: $x-\left(-\frac{2}{3}\right)=-\frac{5}{6}$

Check Your Answer:

Solve: $-2p = 6$

$-2(-3) = 6$

- To solve, you must isolate the variable.
- What number is on the same side as **p**?
- To get **p** by itself, we must undo the multiplication. What is the opposite of multiplication?

1. Draw a line to separate the equation into 2 sides.
2. divide by -2 on both sides.
3. Check your answer by substituting your answer back into the problem.

$\frac{-2p}{-2} = \frac{6}{-2}$

$p = -3$

1. Draw a line to separate the equation into 2 sides.
2. multiply by -2 on both sides.
3. Check your answer by substituting your answer back into the problem.

$\frac{-2z}{1} = 14 \cdot -2$

$z = -28$

Solve: $\frac{-16}{-4} = \frac{-4b}{-4}$

$+4 = b$

Check Your Answer:

Solve: $\frac{x}{1} = -29 \cdot 6$

$x = -174$

Check Your Answer:

Solve: $\frac{-1x}{-1} = \frac{-4}{-1}$

$x = 4$

Solve: $\frac{-1a}{-1} = \frac{16}{-1}$

$a = -16$

Solve: $\frac{-4}{3} \cdot \frac{3}{4}x = \frac{5}{8} \cdot \frac{-4}{3}$

$x = \frac{-20}{24}$

$x = -\frac{5}{6}$

Check Your Answer:

$-\frac{3}{4}\left(-\frac{5}{6}\right) = \frac{5}{8}$

$\frac{15}{24} = \frac{5}{8}$

Solve: $\frac{-7}{4} \cdot \frac{4}{7}x = -\frac{2}{3} \cdot \frac{-7}{4}$

$x = \frac{+14}{12}$

$x = \frac{7}{6}$

Check Your Answer:

Hint: Dividing by a fraction is the same as multiplying by the reciprocal

Ex: $\frac{3}{4}$ $\frac{4}{3}$ $\frac{1}{5}$ $\frac{5}{1}$

Solve: $\frac{10}{1} \cdot \frac{x}{10} = -1.41 \cdot 10$

$x = -14.1$

Check Your Answer:

$\frac{x}{10} = -1.41$

Solve: $-24.99 = 2.1m$

$\div 2.1$

$-11.9 = m$

Check Your Answer:

Equations with Square and Cube Roots

-Isolate the variable by performing the inverse operation

x^2 and $\sqrt{x}$ are inverse operations.

x^3 and $\sqrt[3]{x}$ are inverse operations.

$1^2=1$ $\sqrt[2]{1}=1$ $1\cdot1=1$ $\sqrt{1}=1$

$2^2=4$ $\sqrt[2]{4}=2$ $2\cdot2=4$ $\sqrt{4}=2$

$3^2=9$ $\sqrt[2]{9}=3$ $3\cdot3=9$ $\sqrt{9}=3$

$4^2=16$ $\sqrt[2]{16}=4$ $4\cdot4=16$ $\sqrt{16}=4$

Cube Roots

$1^3 = 1$ $\sqrt[3]{1} = 1$

$2^3 = 8$ $\sqrt[3]{8} = 2$

$3^3 = 27$ $\sqrt[3]{27} = 3$

$4^3 = 64$ $\sqrt[3]{64} = 4$

$5^3 = 125$ $\sqrt[3]{125} = 5$

Example 1

$(\sqrt{x})^2=(15)^2$ $x=225$

-Eliminate the square root by squaring both sides

$\sqrt{4}$ $\sqrt[3]{5}$

Example 2

$(\sqrt[3]{x})^3=(8)^3$

-Eliminate the cube root by cubing both sides

$x=512$

Example 3

$\sqrt{x^2}=\sqrt{64}$

$x=\pm8$

-Eliminate the exponent by taking the square root on both sides

Example 4

$\sqrt[3]{x^3}=\sqrt[3]{8}$

$x=2$

-Eliminate the exponent by taking the cube root on both sides

Example 5

$\sqrt[3]{x^3}=\sqrt[3]{64}$

$x=4$

Example 6

$\sqrt{x^2}=\sqrt{4}$

$x=\pm2$

Can you find the square root or cube root of a negative number? Why or why not?

$\sqrt{-64}$ No Real Numbers $\sqrt[3]{-64}=-4$

Warm up 10/25

Simplify:

$2\cdot(5-3)^3+4$

$2(2)^3+4$

$2(8)+4$

$16+4=20$