

Algebra 2 - Unit 2 Lesson 3 (2.3)

Three Step Equations

- Solve three step equations of all types.

Three step equations are really no different than two step equations. Keep trying to solve by following the order of operations backwards.

Solve: $\frac{3}{2}(x+1) - 2 = 1$ ← PEMDAS

+2 +2

$$\frac{2}{3} \cdot \frac{3}{2}(x+1) = \frac{3}{1} \cdot \frac{2}{3}$$

$$x+1 = 2$$

-1 -1

$$x = 1$$

Solve: $\frac{2}{3} \cdot \frac{3}{2} \left(\frac{x-7}{4} \right) = \frac{-6}{1} \cdot \frac{2}{3}$

This problem looks a lot more complicated than it actually is.

$$4 \cdot \frac{x-7}{4} = -4 \cdot 4$$

$$x-7 = -16$$

+7 +7

$$x = -9$$

$$\frac{3}{4} \cdot \frac{4}{3} (3-2x) = \frac{-4}{1} \cdot \frac{3}{4}$$

$$3-2x = -3$$

-3 -3

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

$$x = 3$$

$$\text{Solve: } 2x^2 + 5 = 11$$

$$\frac{2x^2}{2} = \frac{6}{2}$$

$$\sqrt{x^2} = \pm \sqrt{3}$$

$$x = \pm \sqrt{3}$$

Exponents are still part of the order of operations. When wanting to get rid of the exponent, do it by using roots.

PEMDAS

$$\text{You try one: } -2 + \frac{x^3}{4} = 1$$

$$4 \cdot \frac{x^3}{4} = 3 \cdot 4$$

$$\sqrt[3]{x^3} = \sqrt[3]{12}$$

$$x = \sqrt[3]{12}$$

Solve: $2\sqrt[3]{x} + 9 = 15$

$$\frac{2\sqrt[3]{x}}{2} = \frac{6}{2}$$

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

$$x = 27$$

Get the radical by itself, then get rid of the radical by using powers.

$$\frac{4}{3} \cdot -3 = \frac{3}{4} \sqrt{x-1} \cdot \frac{4}{3}$$

$$(-4)^2 = (\sqrt{x-1})^2$$

$$+1 \quad 16 = x - 1 \quad +1$$

$$17 = x$$

$$\text{Solve: } \frac{3 \log_2(x+1)}{3} = \frac{9}{3}$$

$$\log_2(x+1) = 3$$

$$2^3 = x+1$$

$$x = 7$$

For Logarithms, get the logarithm by itself and then convert. Once you have converted, solve from there.

$$\frac{\ln(2x)}{5} = 1$$

$$\ln(2x) = 5$$

$$\frac{e^5}{2} = \frac{2x}{2}$$

$$x = \frac{e^5}{2}$$

$$\text{Solve: } 2(3)^x + 4 = 10$$

-4 -4

$$\frac{2(3)^x}{2} = \frac{6}{2}$$

$$3^x = 3$$

$$\log_3 3 = x = 1$$

For exponential functions, get the base by itself, then convert to a logarithm. Solve from there.

$$3 \cdot \frac{e^{x+2}}{3} = 5 \cdot 3$$

$$e^{x+2} = 15$$

$$\log_e 15 = x+2$$

$$\ln 15 = x+2$$

-2 -2

$$\ln 15 - 2 = x$$

Homework:

U2.3 Worksheet