

Lesson 7.2- Solving Quadratic Equations with Proportions.notebook

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Lesson 7.2- SWBAT solve quadratic equations by cross multiplying

Kick off- Solve each of the following:

1) $x^2 + 3x = 0$

$$\begin{array}{|c|c|} \hline x & x+3 \\ \hline x=0 & x+3=0 \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline -3 & -3 \\ \hline x=-3 & \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline 16 & 16 \\ \hline -16 & -16 \\ \hline y^2 = 16 & \\ \hline \end{array}$$

$$(y+4)(y-4) = 0$$

$$\begin{array}{|c|c|} \hline y+4 & y-4 \\ \hline y=-4 & y=4 \\ \hline \end{array}$$

$$y+4=0 \quad y-4=0$$

$$\begin{array}{|c|c|} \hline -4 & +4 \\ \hline -4 & +4 \\ \hline y=-4 & y=4 \\ \hline \end{array}$$

$$4) x^2 - x = 6$$

$$\begin{array}{|c|c|} \hline -6 & -6 \\ \hline x^2-x & \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline -6x & \\ \hline +2 & \\ \hline x^2-2x & \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline -3x & \\ \hline +3 & \\ \hline x^2-3x & \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline -6 & -6 \\ \hline x(x+2) & \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline -3 & -3 \\ \hline x(x+2) & \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline -3 & -3 \\ \hline x(x+2) & \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline x-3 & x+2 \\ \hline 0 & 0 \\ \hline +3 & +3 \\ \hline x=3 & x=-2 \\ \hline \end{array}$$

When two ratios (fractions) are set equal to each other they form a proportion.

To solve a proportion, you must cross multiply!! (then factor and solve!)

Examples:

1) $\frac{2}{9} = \frac{4}{x}$

$$\begin{array}{|c|c|} \hline 2 & 4 \\ \hline 9 & x \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline x^2 = 36 & \\ \hline -36 & -36 \\ \hline x^2-36 & = 0 \\ \hline (x+6)(x-6) & = 0 \\ \hline x+6=0 & x-6=0 \\ \hline -6 & +6 \\ \hline x=-6 & x=6 \\ \hline \end{array}$$

2) $\frac{2}{y} = \frac{9}{y+2}$

$$\begin{array}{|c|c|} \hline 2 & 9 \\ \hline y & y+2 \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline 2(y+2) & = 9y \\ \hline 2y+4 & = 9y \\ \hline -2y & \downarrow -2y \\ \hline 4 & = 7y \\ \hline \frac{4}{7} & = y \\ \hline \end{array}$$

3) $x^2 + 4x = 5$

$$\begin{array}{|c|c|} \hline x^2 & 5 \\ \hline x^2 & x \\ \hline \end{array}$$

$$5x^2 = x(x^2 + 4)$$

$$\begin{array}{|c|c|} \hline 5x^2 & x^3 + 4x \\ \hline -5x^2 & -5x^2 \\ \hline 0 & x^3 - 5x^2 + 4x \\ \hline \end{array}$$

$$0 = x(x^2 - 5x + 4)$$

$$\begin{array}{|c|c|} \hline x & (x^2 - 5x + 4) \\ \hline \{ & \{ \\ \hline x(x-1) & -4(x-1) \\ \hline -1 & x(x-4)(x-1) = 0 \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline x=0 & x-4=0 \\ \hline & +4+4 \\ \hline x=0 & x=1 \\ \hline \end{array}$$

$$4) \frac{x+2}{x^2+1} = \frac{x-2}{3}$$

1) $k+3 = k-2$

$$\begin{array}{|c|c|} \hline k+3 & k-2 \\ \hline 3 & -2 \\ \hline \end{array}$$

$$24 = (k+3)(k-2)$$

$$\begin{array}{|c|c|} \hline k^2 & 2k+3k-6 \\ \hline \cancel{k^2} & \cancel{2k+3k-6} \\ \hline 24 & k^2 + 1k - 6 \\ \hline -24 & -24 \\ \hline 0 & k^2 + 1k - 30 \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline 0 & (k^2 - 5k)(6k - 30) \\ \hline -5k & \cancel{k^2} \\ \hline 0 & k(k-5) + 6(k-5) \\ \hline -5 & \cancel{k} \\ \hline 0 & (k+6)(k-5) \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline 0 & k+6 \\ \hline -6 & -6 \\ \hline 0 & -6=k \\ \hline \end{array}$$

$$\begin{array}{|c|c|} \hline 0 & k-5 \\ \hline +5 & +5 \\ \hline 0 & 5=k \\ \hline \end{array}$$