

Algebra 1

Chapter 9

Section 9-4

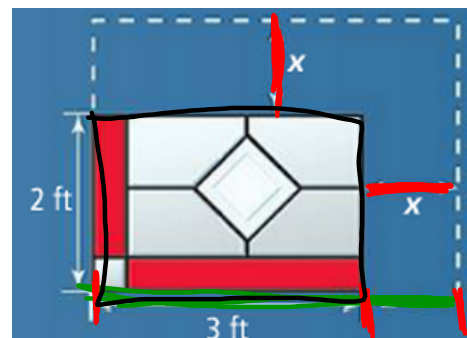
Mar 31-10:28 PM

You are finishing a stained glass hanging that your friend has started. You have enough supplies to add 6 ft^2 to the hanging. You are planning to add the same amount to the length and width. What will be the dimensions of the hanging when you are finished? How do you know?

$$A = \ell w$$

$$A = (x+3)(x+2)$$

$$12 = (x+3)(x+2)$$



Apr 3-4:38 PM

Zero Product Property

If two numbers have a product zero (meaning they multiply to zero), then at least one of the two numbers must be zero.

Zero-Product Property

For any real numbers a and b , if $ab = 0$, then $a = 0$ or $b = 0$.

Example If $(x + 3)(x + 2) = 0$, then $x + 3 = 0$ or $x + 2 = 0$.

$$-3 -3$$

$$x = -3$$

Apr 1-5:51 PM

Use the zero product property to solve the equations

$$x(x - 1) = 0$$

$$x = 0$$

$$x - 1 = 0$$

$$\begin{array}{cc} +1 & +1 \\ x & = 1 \end{array}$$

$$x = 0, 1$$

$$x^2(9 - x) = 0$$

$$\sqrt{x^2} = \sqrt{0}$$

$$x = 0$$

$$9 - x = 0$$

$$\begin{array}{cc} +x & +x \\ 9 & = x \end{array}$$

$$x = 0, 9$$

Apr 2-10:53 PM

Use the zero product property to solve the equations

$$(x - 4)(x - 5) = 0$$

$$\begin{array}{l} x-4=0 \\ +4 \quad +4 \\ x=4 \end{array}$$

$$\begin{array}{l} x-5=0 \\ +5 \quad +5 \\ x=5 \end{array}$$

$$x=4, 5$$

$$(3x + 2)(10x + 30) = 0$$

$$\begin{array}{l} 3x+2=0 \\ -2 \quad -2 \\ 3x=-2 \end{array}$$

$$\begin{array}{l} 3x=-2 \\ \frac{3x}{3} = \frac{-2}{3} \\ x = -\frac{2}{3} \end{array}$$

$$\begin{array}{l} 10x+30=0 \\ -30 \quad -30 \\ 10x=-30 \end{array}$$

$$\begin{array}{l} 10x=-30 \\ \frac{10x}{10} = \frac{-30}{10} \\ x=-3 \end{array}$$

$$x = -\frac{2}{3}, -3$$

$$(x + 2)(x - 1)(9 - x) = 0$$

$$\begin{array}{l} x+2=0 \\ -2 \quad -2 \\ x=-2 \end{array}$$

$$\begin{array}{l} x-1=0 \\ +1 \quad +1 \\ x=1 \end{array}$$

$$\begin{array}{l} 9-x=0 \\ +x \quad +x \\ 9=x \end{array}$$

$$x = -2, 1, 9$$

Apr 2-10:53 PM

Solve the equations by factoring

$$x^2 - 2x - 15 = 0$$

$$(x-5)(x+3) = 0$$

$$\begin{array}{l} x-5=0 \\ +5 \quad +5 \\ x=5 \end{array} \quad \begin{array}{l} x+3=0 \\ -3 \quad -3 \\ x=-3 \end{array}$$

$$x = 5, -3$$

$$x^2 + 12x + 27 = 0$$

$$(x+9)(x+3) = 0$$

$$\begin{array}{l} x+9=0 \\ -9 \quad -9 \\ x=-9 \end{array} \quad \begin{array}{l} x+3=0 \\ -3 \quad -3 \\ x=-3 \end{array}$$

$$x = -9, -3$$

Apr 2-10:53 PM

Standard Form: Quadratic Equations

The quadratic polynomial is written in standard form on one side of the equation leaving zero alone on the other side.

$$ax^2 + bx + c = 0$$

Apr 3-8:23 PM

Write the equation in standard form, then solve by factoring.

$x^2 - 72 = x$ $\begin{array}{r} -x \quad -x \\ \hline x^2 - x - 72 = 0 \end{array}$ $(x+8)(x-9) = 0$ $\begin{array}{r} x+8=0 \\ -8 \quad -8 \\ \hline x = -8 \end{array}$ $\begin{array}{r} x-9=0 \\ +9 \quad +9 \\ \hline x = 9 \end{array}$ $x = -8, 9$	$3x^2 - 11x - 7 = 2x^2 - 31$ $\begin{array}{r} -2x^2 \quad +31 \\ \hline x^2 - 11x + 24 = 0 \end{array}$ $(x-8)(x-3) = 0$ $\begin{array}{r} x-8=0 \\ +8 \quad +8 \\ \hline x = 8 \end{array}$ $\begin{array}{r} x-3=0 \\ +3 \quad +3 \\ \hline x = 3 \end{array}$ $x = 8, 3$
--	--

Apr 2-10:53 PM

Solve by factoring completely.

$$x^4 + x^3 - 2x^2 = 0$$

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

$$x^2(x+2)(x-1) = 0$$

$$\sqrt{x^2} = \sqrt{0}$$

$$x = 0$$

$$x+2=0$$

$$\begin{array}{r} -2 \quad -2 \\ \hline x = -2 \end{array}$$

$$x-1=0$$

$$\begin{array}{r} +1 \quad +1 \\ \hline x = 1 \end{array}$$

$$x = 0, -2, 1$$

$$3x^3 - 7x^2 - 12x + 28 = 0$$

$$x^2(3x-7) - 4(3x-7) = 0$$

$$(3x-7)(x^2-4) = 0$$

$$3x-7=0$$

$$\begin{array}{r} +7 \quad +7 \\ \hline 3x = 7 \\ \frac{3x}{3} = \frac{7}{3} \\ x = \frac{7}{3} \end{array}$$

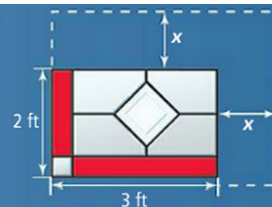
$$x^2-4=0$$

$$\begin{array}{r} +4 \quad +4 \\ \hline \sqrt{x^2} = \sqrt{4} \\ x = 2, -2 \end{array}$$

$$x = \frac{7}{3}, 2, -2$$

Apr 2-10:53 PM

You are finishing a stained glass hanging that your friend has started. You have enough supplies to add 6 ft² to the hanging. You are planning to add the same amount to the length and width. What will be the dimensions of the hanging when you are finished? How do you know?



$$(x+3)(x+2) = 12$$

$$x^2 + 2x + 3x + 6 = 12$$

$$x^2 + 5x + 6 = 12$$

$$\begin{array}{r} -12 \quad -12 \\ \hline x^2 + 5x - 6 = 0 \end{array}$$

$$(x+6)(x-1) = 0$$

3 ft by
4 ft

$$x+6=0$$

$$\begin{array}{r} -6 \quad -6 \\ \hline x = -6 \end{array}$$

$$x-1=0$$

$$\begin{array}{r} +1 \quad +1 \\ \hline x = 1 \end{array}$$

Apr 3-4:38 PM