

So Far:

$$(x+3)(x-7)$$

Factored

$$x^2 + 4x - 12$$

$$(x+2)^2 - 16$$

Solve:

$$\sqrt{x^2} = \sqrt{9}$$

$$x = \pm\sqrt{9}$$

$$x = \pm 3$$

$$x^2 - 9 = 0$$

$$2x^2 - 32 = 0$$

$$\frac{2x^2}{2} = \frac{32}{2}$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = 4 \text{ AND } -4$$

$$x = \pm 4$$

Solve the following (each has 2 solutions)

$$(2x-3)(x+5) = 0$$

\downarrow \downarrow
 $x-3=0$ $x+5=0$
 $2x=3$ $x=-5$
 $x = \frac{3}{2}$ $x = -5$

$$x^2 - 5x - 14 = 0$$

$-7, 2$ $\otimes -14$
 $\oplus -5$
 $(x-7)(x+2) = 0$
 \downarrow \downarrow
 $x-7=0$ $x+2=0$
 $x=7$ $x=-2$

$$-2(x+3)^2 + 8 = 0$$

$-2(x+3)^2 = -8$
 $\frac{-2}{-2} \quad \frac{-8}{-2}$
 $\sqrt{(x+3)^2} = \sqrt{4}$
 $x+3 \xrightarrow{-3} = \pm 2$
 $x = -3 \pm 2$
 \downarrow \downarrow
 $x = -1$ $x = -5$

Solve the following

$$2x^2 + 5x - 12 = 0$$

$$2x - 12 = \textcircled{-24}$$

$$= 2x^2 - 3x + 8x - 12 = 0$$

$$\begin{array}{l} \textcircled{\times} -24 \\ \textcircled{+} 5 \end{array}$$

1	24
2	12
<u>-3</u>	<u>8</u>
4	6

$$\textcircled{\times} \underline{(2x-3)} \textcircled{+} \underline{4(2x-3)} = 0$$

$$= (2x-3)(x+4) = 0$$

$$2x - 3 = 0$$

$$2x = 3$$

$$\textcircled{x = \frac{3}{2}}$$

$$x + 4 = 0$$

$$\textcircled{x = -4}$$

Quadratic Formula

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

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

We know the solutions to $2x^2 + 5x - 12 = 0$

are -4 and $\frac{3}{2}$ or 1.5

Show this using the quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(5) \pm \sqrt{(5)^2 - 4(2)(-12)}}{2(2)}$$

$$x = \frac{-5 \pm \sqrt{25 + 96}}{4}$$

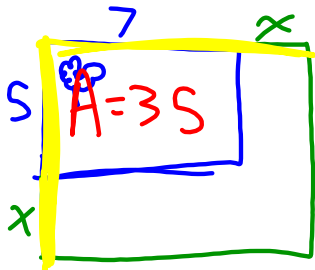
$$x = \frac{-5 \pm \sqrt{121}}{4}$$

$$x = \frac{-5 \pm 11}{4}$$

$$x = \frac{-5 + 11}{4} = \frac{6}{4} \Rightarrow \frac{3}{2}$$

$$x = \frac{-5 - 11}{4} = -4$$

A rectangular garden measures 5 m by 7 m. Both dimensions are to be extended by the same amount so that the area of the garden is doubled. Draw a picture of this situation. Determine how much the dimensions should increase, to the nearest tenth of a metre?



$$\text{New Area} = 70\text{m}^2$$

$$(x+5)(x+7) = 70$$

$$x^2 + 7x + 5x + 35$$

$$x^2 + 12x + 35 = 70 - 70$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$1x^2 + 12x - 35 = 0$$

$$x = \frac{-12 \pm \sqrt{12^2 - 4(1)(-35)}}{2(1)}$$

$$x = \frac{-12 \pm \sqrt{144 + 140}}{2}$$

$$x = \frac{-12 \pm \sqrt{284}}{2}$$

$$x = \frac{-12 - 16.85}{2}$$

$$x = \frac{-12 - 16.85}{2} = -14.43$$

Non-sense

$$x = \frac{-12 + 16.85}{2}$$

$$x = 2.43$$

\therefore Increase the lengths of the garden by 2.43m.

Solve

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