

Solving Quadratic Equations:

- Factoring
- Square Roots

→ Not everything is factorable

These are good methods, BUT they only work some of the time

Only possible if $b=0$ or eq. is in **Vertex Form.**

A smoke jumper jumps from a plane that is at an altitude of 1700 ft. The function $y = -16t^2 + 1700$ gives the jumper's height y in feet after t seconds.

- a. How long is the jumper in free fall if the parachute opens at 1000 ft?

$$1000 = -16t^2 + 1700$$

$$-1700 \quad -1700$$

$$-700 = -16t^2$$

$$\frac{-700}{-16} = \frac{-16t^2}{-16}$$

$$43.75 = t^2$$

$$t = 6.6$$

- b. How long would it take to reach the ground if the parachute didn't open?

$$0 = -16t^2 + 1700$$

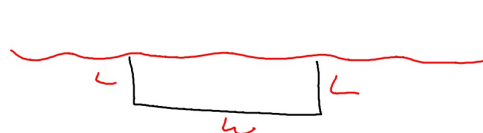
$$-1700 \quad -1700$$

$$\frac{-1700}{-16} = \frac{-16t^2}{-16}$$

$$t = 10.3 \text{ sec}$$

A farmer has 1200 feet of fencing to create a rectangular enclosure for his livestock. If one side of the enclosure will use an existing fence find the lengths of the other sides that will maximize the area of the enclosure.

Show your work and explain your reasoning used to answer this question.



$$2L + w = 1200$$

$$w = 1200 - 2L$$

$$w = 1200 - 2(300)$$

$$w = 600$$

$$A = L \cdot w$$

$$A = L \cdot (1200 - 2L)$$

$$A = 1200L - 2L^2$$

$$\text{LOS } L = \frac{-1200}{-4}$$

$$L = 300$$

The dimensions are 300x600

Find the equation of a quadratic, in Standard Form, with the following x-intercepts:

4 and -3

$$y = (x - 4)(x + 3)$$

$$y = x^2 - x - 12$$

$y = x^2 - x - 12$ is only one of an infinite number of parabolas that have the x-intercepts of 4 and -3

the equation for this quadratic is actually:
 $y = a(x - 4)(x + 3)$

How do you find the value of a ?

You need another piece of information ---- another point on the parabola.

If the parabola passes through the point $(-6, 120)$ find the value of a .

$$120 = a(-6)(-3) \quad \begin{matrix} x & y \\ & a \end{matrix}$$
$$\frac{120}{30} = \frac{30a}{30} \quad a = 4$$

A parabola has the following x-intercepts -2.5 & -0.25 .
The parabola also passes through the point $(2, -189)$.
Write the equation of this parabola in Standard Form.

$$y = a(2x + 5)(4x + 1)$$
$$-189 = a(9)(9)$$
$$\frac{-189}{81} = \frac{81a}{81}$$
$$\frac{-21}{9} = a$$
$$-\frac{7}{3} = a$$
$$-\frac{7}{3}(2x + 5)(4x + 1)$$
$$-\frac{7}{3}(8x^2 + 22x + 5)$$
$$\frac{-56}{3}x^2 - \frac{154}{3}x - \frac{35}{3}$$