SOLVING QUADRATICS

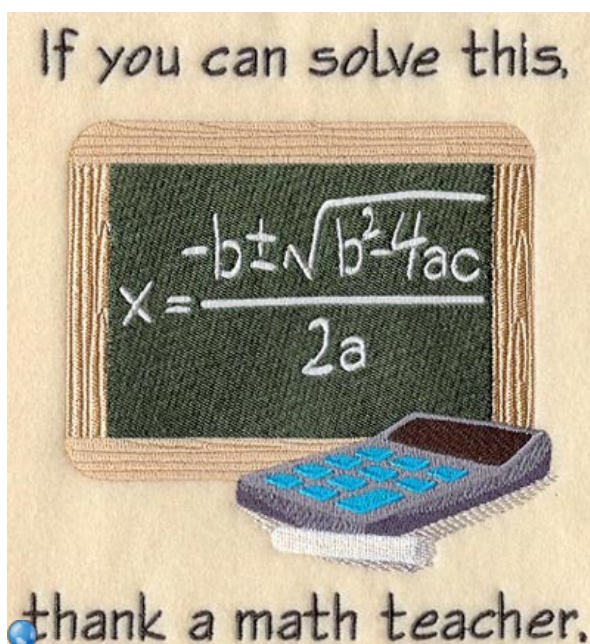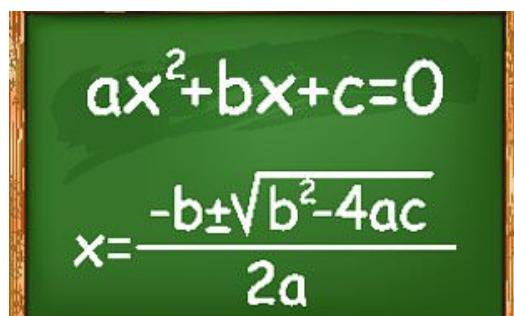If you can solve this,

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

thank a math teacher.

BY QUADRATIC FORMULA

The quadratic formula comes about by a process called 'completing the square' when dealing with quadratic functions.

It is basically a way to determine the roots all the time, regardless if the equation can be factored or not.

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

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

EXAMPLE 1 | Connecting the quadratic formula to factoring

Solve the following equation:
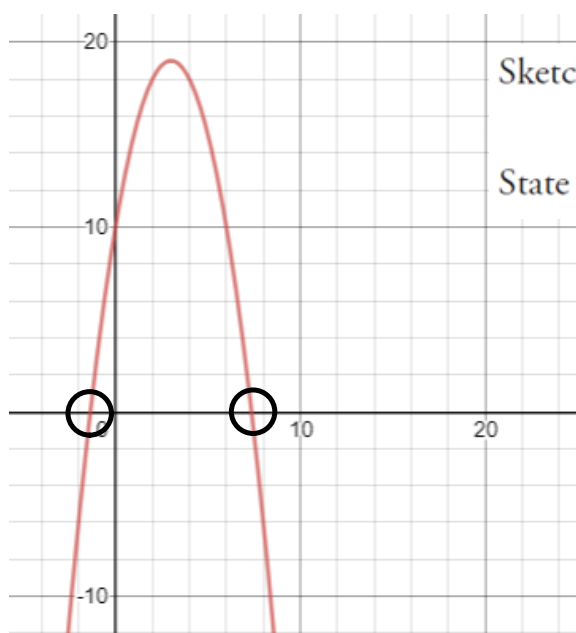$$6x^2 - 3 = 7x$$

Solving by Quadratic Formula

EXAMPLE 2
| Determining the exact solution to a quadratic equation

Solve this quadratic equation:

$$2x^2 + 8x - 5 = 0$$

State your answer as an exact value.

Remember when were doing partial factoring earlier? Now we can find the roots!
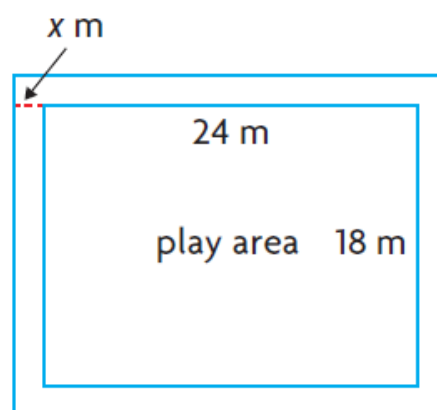
Sketch the graph of the following quadratic function:
$$f(x) = -x^2 + 6x + 10$$
State the domain and range of the function.

LEARN ABOUT *the Math*

Ian has been hired to lay a path of uniform width around a rectangular play area, using crushed rock. He has enough crushed rock to cover 145 m^2.

? If Ian uses all the crushed rock, how wide will the path be?

x m

24 m

play area   18 m

| EXAMPLE 4 | Using the quadratic formula to solve a quadratic equation |

Determine the width of the path that will result in an area of 145 m^2.

Solving by Quadratic Formula

In Summary

Key Idea

- The roots of a quadratic equation in the form $ax^2 + bx + c = 0$, where $a \neq 0$, can be determined by using the quadratic formula:

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

Need to Know

- The quadratic formula can be used to solve any quadratic equation, even if the equation is not factorable.
- If the radicand in the quadratic formula simplifies to a perfect square, then the equation can be solved by factoring.
- If the radicand in the quadratic formula simplifies to a negative number, then there is no real solution for the quadratic equation.