OTL - The Quadratic Formula

1. For each quadratic relation, *solve* (find the roots) using the quadratic formula.

   Check your answer by factoring.

   a. $0 = x^2 + 6x + 5$
   b. $5x^2 - 14x - 3 = 0$
   c. $4x^2 - 9 = 0$

2. For each quadratic relation, *solve* (find the roots) using the quadratic formula.

   Express answers as *exact roots* and as *approximate roots*, to the nearest hundredth.Check your answer by making a graph using Desmos.

   a. $x^2 + 5x + 2 = 0$
   b. $x^2 - x + 2 = 0$
   c. $0 = x^2 + 6x + 9$
   d. $\frac{x^2}{2} - x - \frac{5}{2} = 0$
   e. $0 = 0.1x^2 + 0.4x - 0.3$

3. Sipapu Natural Bridge is in Utah.

The equation $y = -0.04x^2 + 3.28x$ can be used to model the arch of the bridge, where x is the horizontal distance in metres, and y is the height above the ground.

a. What is the horizontal distance in meters, across this natural arch, at it's base (ground level)?

b. How far off the ground is the arch at it's highest point?

c. Check your answers to parts a) and b) above by graphing using Desmos.

4. The world's largest hedge maze is on the grounds of an English country house known as Longleat.

   The maze is created from 16180 yew trees.

   The outer boundaries of the maze form a rectangle.

   The length of that rectangle is 60 metres more than the width.

   The total area is 6496 m^2.

   What are the dimensions of the outer boundaries of the maze?

5. The hypotenuse of a right triangle measures 20 cm.

   The sum of the lengths of the other two sides is 28 cm.

   Find the actual lengths of the other two sides.