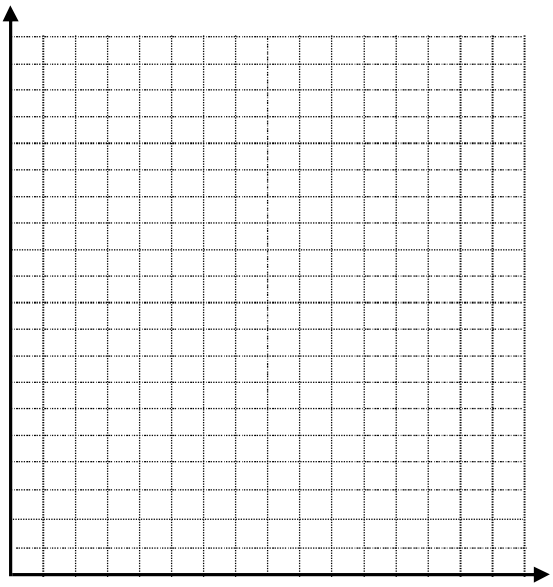
DAY 6 – Understanding Problems Involving Quadratic Relations

1. The manager of a hockey arena is pricing tickets for an upcoming game. She knows that if she increases the ticket price she will sell fewer tickets. The situation is modelled by the relation $R = -100(P-15)^2 + 22500$, where *R* is the total revenue and *P* is the ticket price, both in dollars.

   a. Create a table of values and graph the relation. Label axes and give graph a title.

x	$-100(x-15)^2+22500$	y

place vertex in middle →



   b. What is the vertex of the parabola? _____

   c. What do the coordinates of the vertex represent in this situation?

2. The Windsor-Detroit International Freedom Festival hosts one of the largest fireworks displays in the world. The fireworks are set off over the Detroit River. The path of a particular firework rocket is modelled by the relation $h = -4.9(t-2)^2 + 169.6$, where *h* is the rocket's height above the water, in metres, and *t* is the time, in seconds.

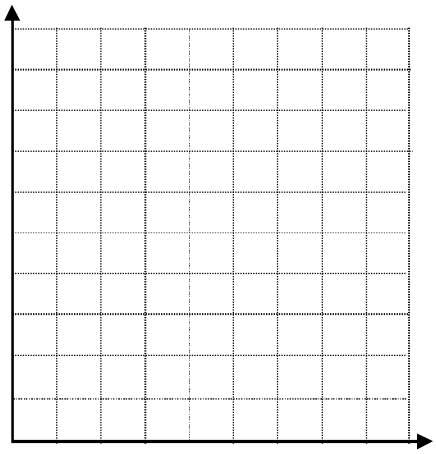
   a. How long will the rocket take to reach its maximum height? _____

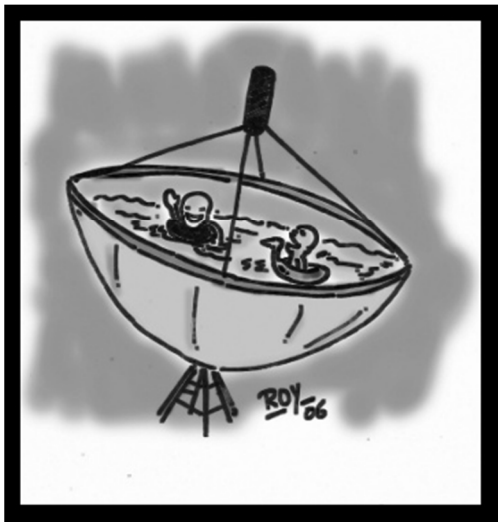
   b. What is the maximum height? _____

   c. A firework rocket will stay lit for an average of 5 s. What will the height of a rocket be 5 s after it is launched?

3. The shape of a satellite dish is parabolic. the dish is 5 cm deep and 40 cm wide.

   a. Sketch the parabola opening up. Label axes and give graph a title.





   b. Write a relation of the form $y = a(x-h)^2 + k$ that models the shape of this dish. The point (21, 0.0125) is also on the parabola.