Date: _____

Interpreting Quadratic Relations

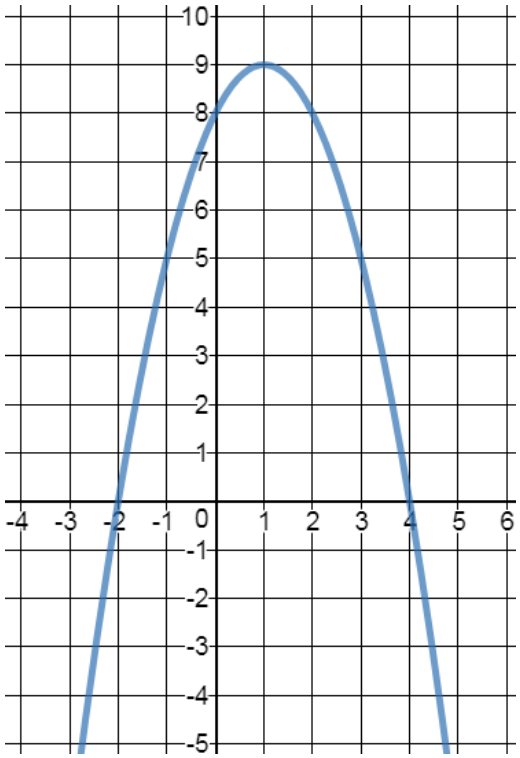
Example 1

Use graphing technology (like Desmos) to graph the relation.

Sketch your graph.

Identify the key features.

$$y = -x^2 + 2x + 8$$



a. vertex: _____

b. equation of axis of symmetry: _____

c. direction of opening: _____

d. max or min value: _____

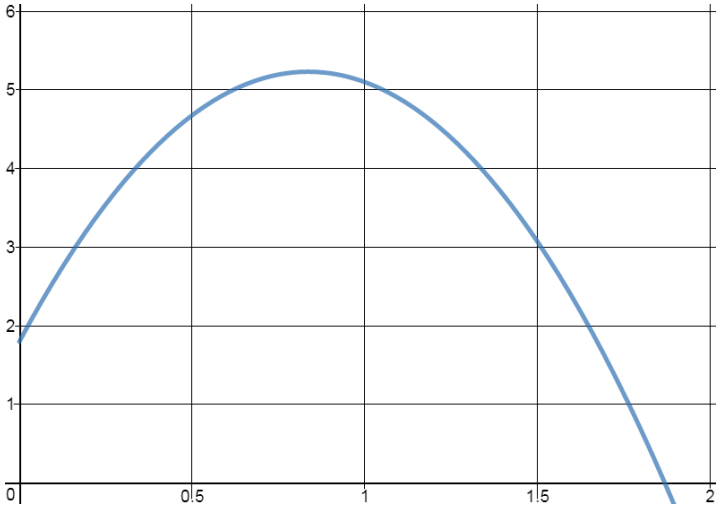
e. y-intercepts: _____

f. x-intercepts: _____

Example 2

The equation $h = -4.9d^2 + 8.2d + 1.8$ models the path of a Canadian High School shot put throw, where h is the height of the shot put in metres and d is the horizontal distance from where it was released in metres.

a. Use the graphing technology to graph the relation.



b. From what height was the shot put released? _____

c. How far did the shot put go? _____

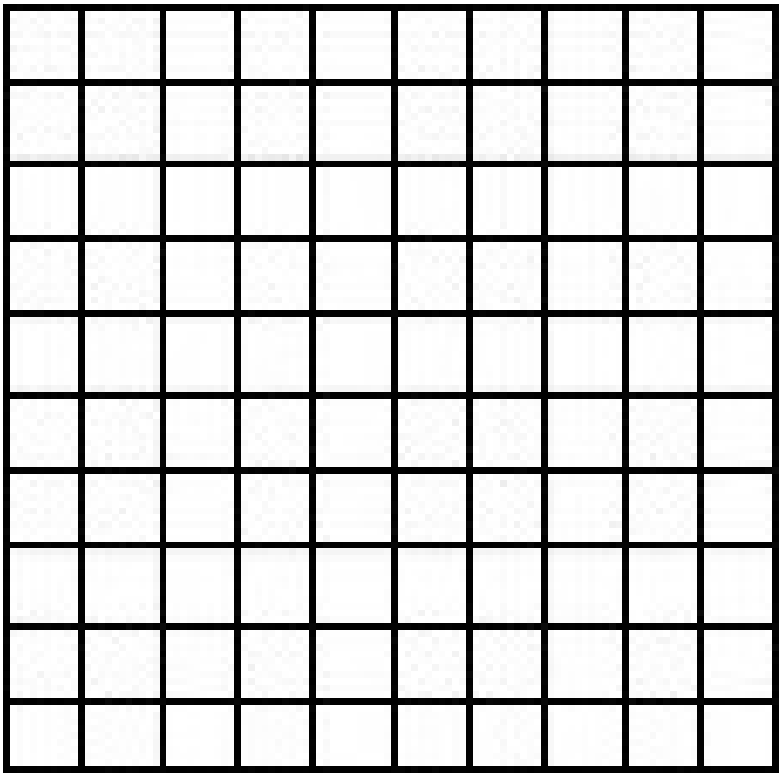
d. How high was the shot put 1.5 m away from where it was released? _____

Example 3

The data represents the height of a baseball after being hit.

a. Plot the data using graphing technology. Sketch your graph.

Time (s)	Height (m)
0	2
1	27
2	42
3	48
4	43
5	29
6	5



b. Find the equation of best fit. (round to one decimal place)

c. The maximum height of the ball is _____.

d. The ball hits the ground after _____.

Homework:

1. A football is punted into the air. Its height, H, in metres, after t seconds is modelled by the equation: $H = -4.9(t - 2.4)^2 + 29$. Use graphing technology to graph the equation and answer the following questions.
   a. At what height was the football kicked?
   b. What is the maximum height of the football?
   c. How high was the football after 2 seconds? Was it going up or down at that point?
   d. Was the ball still in the air at 5 seconds?
2. A model rocket is fired off of a cliff. The rocket's flight is modelled with the equation: $H = -4.9t^2 + 45t + 87.5$. Use graphing technology to graph the equation and answer the following questions.
   a. What is the maximum height of the rocket?
   b. When does the rocket reach maximum height?
   c. How high is the cliff?
3. It is determined that the safe stopping distance, d (in metres) for a heavy aircraft travelling at v km/h is given by the equation: $d = 0.003(6v^2 + 400v + 50000)$.
   a. What is the safe stopping distance if the plane is travelling at 100 km/h?
   b. If there is only 200 m to stop, what is the max speed a plane can be travelling?
4. It is found that the safe stopping distance (in metres) for a boat travelling at v km/h is given by the equation: $d = 0.002(2v^2 + 10v + 3000)$.
   a. What is the safe stopping distance for a boat going 12 km/h?
   b. Determine the speed at which the boat is travelling to be able to stop in 15 m.

Answers:

1.

a. 0.776 m b. 29 m

c. 28.22 m, going up d. No

2.

a. 190.8 m b. 4.59 s c. 87.5 m

3.

a. 450 km/h b. 29 km/h

4.

a. 6.8 m b. 45 km/h