

Learning Activity – Sections 7.1 – Quadratic Functions and Applications

Names: _____

1. Use the function $f(x) = -(x-2)^2 + 1$ to complete (a) through (h).

a. Determine whether the graph of the parabola opens upward or downward.

b. Identify the vertex.

c. Determine the x -intercepts.

d. Determine the y -intercept.

e. Sketch the function.

f. Determine the axis of symmetry.

g. Determine the minimum or maximum value of the function.

Fill in the blanks:

The _____ value is and it occurs at $x =$ _____.
maximum / minimum

h. Write the domain and range in interval notation.

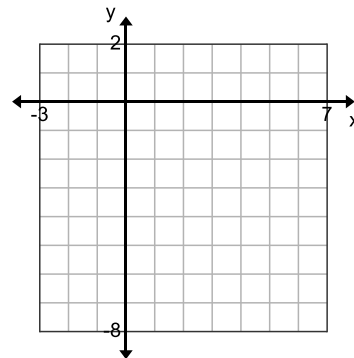
Domain: _____ Range: _____

2. Use the function $f(x) = x^2 - 6x - 27$ to complete (a) through (c).

a. Write the function in vertex form.

b. Identify the vertex.

c. Determine the x -intercepts.



3. Use the function $f(x) = 4x^2 + 20x + 23$ to complete (a) through (h).

a. Write the function in vertex form.

b. Identify the vertex.

c. Determine the x -intercepts.

d. Determine the y -intercept.

e. Sketch the function.

f. Determine the axis of symmetry.

g. Determine the minimum or maximum value of the function.

Fill in the blanks:

The _____ value is and it occurs at $x =$ ____ .
maximum / minimum

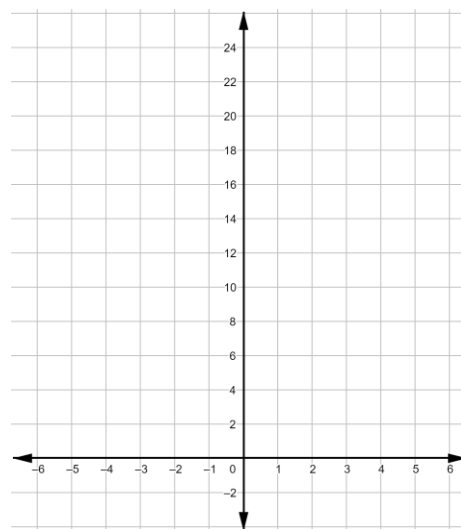
h. Write the domain and range in interval notation.

Domain: _____ Range: _____

4. Use the function $f(x) = -\frac{3}{2}x^2 + 12x - 5$ to complete (a) and (b).

a. Find the vertex of the parabola using the vertex formula.

b. Does the vertex correspond to a maximum or minimum value? What is the value?



5. The path of a baseball struck by a bat is given by the function $b(t) = -16t^2 + 112t + 5.1$, where t represents time in seconds since the ball was struck and $b(t)$ represents the height of the ball in feet.

a. Fill in the blanks.

- The input variable of the function is _____, and it represents the _____ in _____ since the baseball was _____.
- The output is given symbolically by _____ which represents the _____ of the baseball in _____.
- The graph of $y = b(t)$ is a _____ opening _____. The vertex corresponds to the _____ value of the function.
maximum / minimum

b. Find the exact value of the maximum height of the ball and the time at which it reaches this maximum. Include appropriate units in your answer.

c. Fill in the blanks.

- The ball hits the ground when height of the ball is _____ feet. To find the time at which the ball hits the ground, we solve the equation $b(t) = \underline{\quad}$.

d. How long does it take for the ball to hit the ground? Round your answer to the nearest hundredth of a second.