1. The standard form of a quadratic equation.

2. The u-shaped curve created by a quadratic equation.

3. The vertical line that divides the parabola into two equal parts.

4. The formula for the axis of symmetry.

5. The turning point of a parabola.

6. A vertex that is the highest point.

7. A vertex that is the lowest point.

8. The points at which the parabola intersects the x-axis.

9. The vertex form of a quadratic equation.

10. (0,c) is the ____________

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Complete the following.

axis of symmetry  __________ increasing  __________

vertex  __________ decreasing  __________

domain  __________

range  __________

x-intercepts  __________

y-intercept  __________

vertex form of equation  __________

standard form of equation  __________
Application Problem

10. A high school baseball player throws a ball straight up into the air for his math class. The math class was able to determine that the relationship between the height of the ball and the time since it was thrown could be modeled by the function \( h(t) = -16t^2 + 96t + 6 \), where \( t \) represents the time (in seconds) since the ball was thrown, and \( h \) represents the height (in feet) of the ball above the ground.

A. The domain is ______________________ and it represents ____________________________.

B. What does the range of this function represent?

C. What is the time \((t)\) when the ball is thrown?

D. At what height does the ball get thrown?

E. In vertex form the equation is \( h(t) = -16(t - 3)^2 + 150 \). What is the vertex of this parabola?

F. What is the maximum height that the ball reaches while in the air? How long will the ball take to reach its maximum height?

G. It would be difficult to tell from the equation how many seconds it takes the ball to hit the ground. Graph the equation in the grid at the right and make an estimate.
4. A student throws a bag of chips to her friend. Unfortunately, her friend does not catch the chips, and the bag hits the ground. The distance from the ground (height) for the bag of chips is modeled by the function \( h(t) = -16t^2 + 32t + 4 \) or \( h(t) = -16(t - 1)^2 + 20 \), where \( h \) is the height (distance from the ground in feet) of the chips, and \( t \) is the number of seconds the chips are in the air.

A. Graph \( h \).

B. From what height are the chips being thrown? Explain how you know.

C. What is the maximum height the bag of chips reaches while airborne? Explain how you know.

D. About how many seconds after the bag was thrown did it hit the ground?

E. What is the average rate of change of height for the interval from 0 to \( \frac{1}{2} \) second? What does that number represent in terms of the context?

F. Based on your answer to part (e), what is the average rate of change for the interval from 1.5 to 2 sec.?