Standard to Vertex Form

Name: _____

1) The height, y, in feet, a ball will reach when thrown in the air is given by the equation $y = -16t^2 + 30t + 6$.

a) Find to the nearest tenth, the maximum height, in feet, the ball will reach.

b) What is the height of the ball after 2 seconds?

c) Write the equation y in vertex form.

2) A baseball player throws a ball from the outfield toward home plate. The ball's height above the ground is modeled by the equation $y = -16t^2 + 48t + 6$, where y represents height, in feet.

a) What is the initial height the ball is thrown from?

b) At what time does the ball reach its maximum height?

c) Does the ball reach a height of 50 ft.? Justify your answer.

3) Jessica is standing on a hill 80 feet high. She throws a baseball upward with an initial velocity of 64 feet per second. The height of the ball h(t) in terms of the time, t, since the ball was thrown is $h(t) = -16t^2 + 64t + 80$.

a) Write the equation h(t) in vertex form.

b) What is the maximum height of the ball?

c) Which is greater h(1.5) or h(2.7)? Justify your answer.

4) The weekly profit function in dollars of a small business that produces fruit jams is $P(x) = -0.4x^2 + 40x – 360$ where x is the number of jars of jam produced and sold.

a) Find the number of jars of jam that should be produced to maximize weekly profit.

b) What is the weekly profit if 75 jars of jam are sold?

c) Write the equation P(x) in vertex form.

5) During archery practice, Paula shoots an arrow into the air such that its height at any time, t, is given by the function $h(t) = -16t^2 + kt + 5$.

a) If the maximum height of the arrow occurs at time t = 3.5 seconds, what is the value of k?

b) Evaluate h(4).

6) The graph of $y = (2x – 4)(x – 4)$ is a parabola in the xy-plane. In which of the following equivalent equations do the x- and y-coordinates of the vertex of the parabola appear as constants or coefficients? (Non-calc)

(A) $y = 2x^2 – 12x + 16$

(B) $y = 2x(x – 6) + 16$

(C) $y = 2(x – 3)^2 + (-2)$

(D) $y = (x – 2)(2x – 8)$

7) The parabola $y = x^2 + bx + c$ is symmetric with respect to the line x = 5. Find the value of b.

8) A parabola has its minimum at x = 2. Which of the following could be the equation of the parabola? (Non-calc)

(A) $y = x^2 + 4x + 5$

(B) $y = 3x^2 – 12x – 2$

(C) $y = 3x^2 + x + 2$

(D) $y = x^2 + 2x + 3$