Algebra II 4.1 Vertex Apps Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A pyrotech shoots fireworks vertically into the air from the ground with an initial velocity of 192 feet per second. The height in feet (h) with relation to time (t) of the fireworks is given by $h\left(t\right)=-16t^{2}+192t$

a.) How long does it take the firework to reach its maximum height?

b.) What is the maximum height reached by the fireworks?

c.) How long does it take for the firework to hit the ground?

2. The owner of a company that produces handcrafted music stands hires a consultant to help set the selling price for the product. The consultant analyzes the production costs and consumer demand for the stands and arrives at the profit, $P\left(x\right)=-0.3x^{2}+75x-2000$ where x represents the selling price of the stands.

a.) At what price should the stands be sold to earn the maximum profit?

b.) According to the function, what is the maximum profit that the company can make?

c.) What are the break-even points (the selling price for which the profit (y) is 0)? Give your answer to the nearest cent.

d.) When the price is of the stands is $50, how much profit is made?

e.) When profit is $2,000, what is the selling price of the stands?

3. Each year a school's booster club holds a dance to raise funds. In the past, the profit the club made after paying the DJ and other costs has been modeled by the function $P\left(t\right)=-16t^{2}+800t-4000$ where t represents the ticket price in dollars, and P(t) is the profit the club made.

a.) What ticket price gives the maximum profit?

b.) What is the maximum profit?

c.) What ticket price(s) would generate a profit of $5,424?

d.) How much profit (P) would be made if the tickets (t) to the dance where $15?

4. A ball is thrown in an upward direction off of a platform that is 45 feet high with an initial velocity of 60 feet per second. The height, in feet, of the ball at time t is given by $h\left(t\right)=-16t^{2}+60t+45$. The time, t, is given in seconds.

a.) At what time after the ball is thrown is the ball at 45 feet again?

b.) Find the maximum height the ball reaches.

c.) Find the time when the ball hits the ground.

5. The equation for the cost in dollars of producing automobile tires is $C=0.000015x^{2}-0.03x+35$, where C is the cost per tire and x is the number of tires produced.

a.) What number of tires is needed to be produced to minimize the cost?

b.) What is the cost for that number of tires?

c.) When the cost is $50 per tire, how many tires are being produced?