Math 2   Name _____

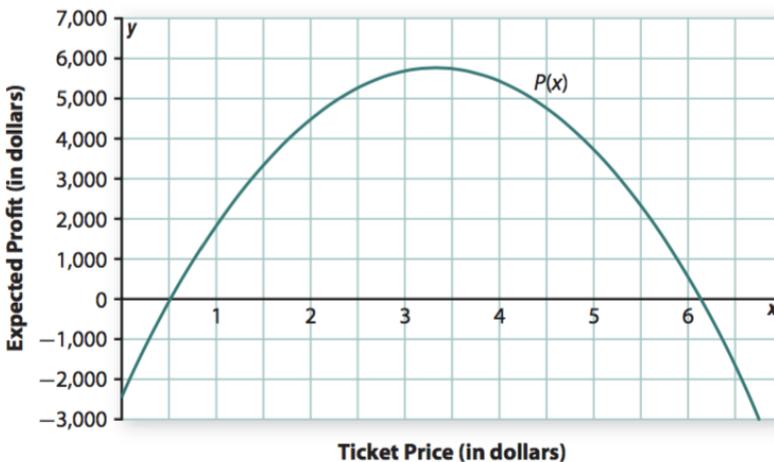Quadratic Inequalities   Per _____ Date _____

1. 1. Suppose that plans for a fundraising raffle shows that profit P will depend
    on ticket price x according to the function $P(x) = -2{,}500 + 5{,}000x - 750x^2$.
    A graph of profit as a function of ticket price is shown here.

Raffle Fundraiser Profit

a. Use the graph to estimate solutions of the inequalities.

i. $-2{,}500 + 5{,}000x - 750x^2 > 0$

ii. $P(x) < 0$

b. If the fundraising event has a goal of raising $2500 use the above graph to answer the
following questions.

i.   What ticket price(s) will give you a profit of exactly $2,500?

ii. What ticket price(s) will yield a profit greater than $2500?

iii. What ticket price(s) will yield a profit less than the target amount?

2. The next graph shows the height of the main support cable on a suspension bridge. The function defining the curve is
$h(x) = 0.04x^2 - 3.5x + 100$, where x is horizontal distance (in feet) from the left end of the bridge and *h(x)* is the height (in feet) of the cable above the bridge surface.
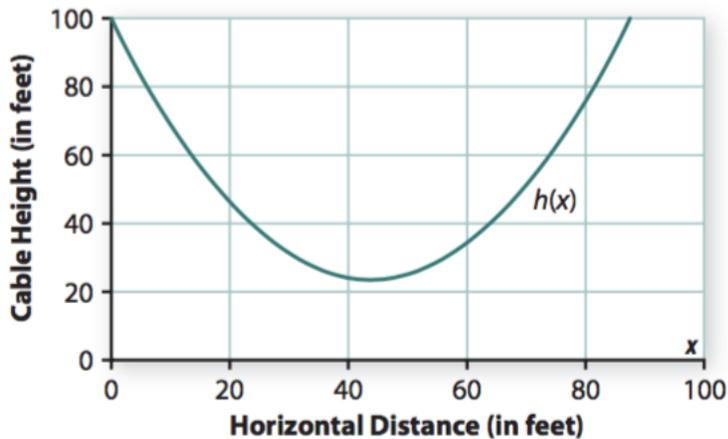
a. Where is the bridge cable less than 40 feet above the bridge surface?

b. Where is the bridge cable at least 60 feet above the bridge surface?

c. Where is the cable 80 feet above the bridge surface?

3. Write each function in an equivalent factored form.

a. $h(t) = 5t^2 - 45t$

b. $g(x) = 18x - 6x^2$

c. $A(l) = 16l^2 + 4l$

d. $f(x) = -2x^2 - 10x$

e. $p(x) = 24x - 10x^2$

f. $h(x) = 8x^2 - 12x$

4. Using the factored form from number 3, find the x-intercepts for each function.

a.   b.   c.

d.   e.   f.

5. Using the factored form of each function, identify the vertex as a maximum or minimum. Find the *(x, y)* for each point maximum/minimum value.

a. $h(t) = 5t^2 - 45t$ b. $g(x) = 18x - 6x^2$ c. $f(x) = -2x^2 - 10x$

6. Yordan Alvarez, designated hitter for the Houston Astros, hit a ball that was 3 feet of the ground and reached the maximum height of 192 feet in 3.4 seconds.

a. Find the initial upward velocity of the baseball.

b. Write the function rule to model the path of the baseball.