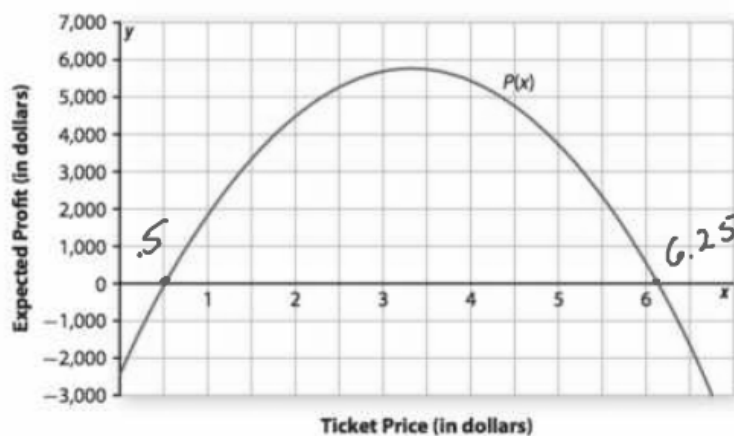


What you will learn about:
Inequalities in One Variable

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

$$.5 < x < 6.25$$

$$(.5, 6.25)$$

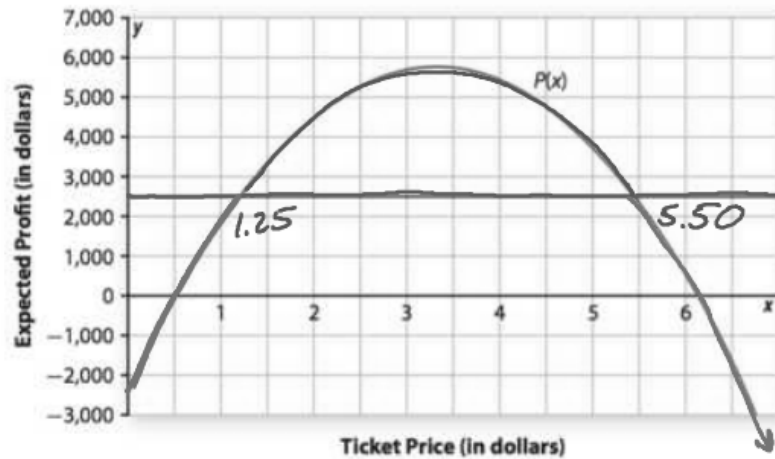
- ii. $P(x) < 0$

$$0 \leq x < .5 \text{ OR } x > 6.25$$

$$[0, .5) \cup (6.25, \infty)$$

Interval Notation

2. If the fund raising event wants to raise \$2,500 use the graph to answer the following questions.



- a. What ticket price will give you a profit of exactly \$2,500?

$1.25, 5.50$

- b. What ticket price(s) will yield a profit greater than \$2,500?

i. Symbolic Notation $1.25 < x < 5.50$

ii. Interval Notation $(1.25, 5.50)$

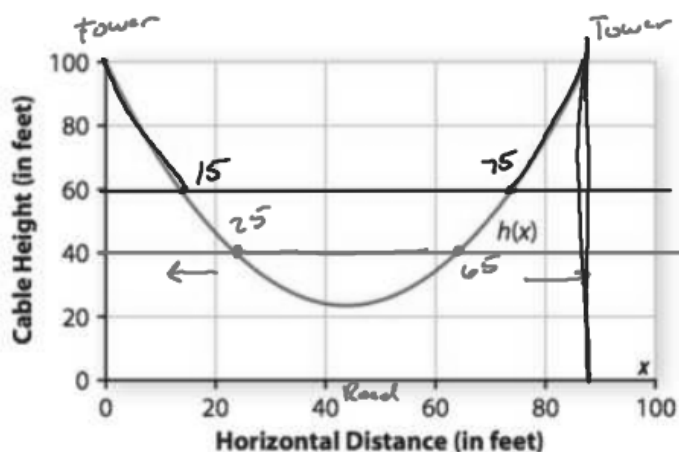
- c. What ticket price(s) will yield a profit less than the target amount?

i. Symbolic Notation $0 \leq x < 1.25$ OR $x > 5.50$

ii. Interval Notation $[0, 1.25) \cup (5.50, \infty)$



3. 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.



For questions in Parts a-d:

- Write an algebraic calculation, equation, or inequality whose solution will provide an answer to the question.
- Then use the graph above to estimate the solution and calculator tables and graphs of $h(x)$ to sharpen the accuracy to the nearest tenth.
- Express your answer with a symbolic expression and (where appropriate) a number line graph.

- a. Where is the bridge cable less than 40 feet above the bridge surface? $0.04x^2 - 3.5x + 100 < 40$

$$25 < x < 65$$

$$(25, 65)$$



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

$$0.04x^2 - 3.5x + 100 \geq 60$$

$$0 \leq x \leq 15 \text{ OR } 75 \leq x \leq 90$$

$$[0, 15] \cup [75, 90]$$



- c. How far is the cable above the bridge surface at a point 45 feet from the left end?