

Algebra II

7-7

Word Problems

In a quadratic, where is the minimum or maximum value always located?

the vertex, where
the derivative = 0

How can we tell if a quadratic will have a maximum or a minimum just by looking at the equation?

a is positive \rightarrow min \curvearrowright

a is negative \rightarrow max

Given the vertex

the input that causes a max or min to occur. (h, k) value of the max or min

1) The sum of two numbers is 20. If one number is x , then the other number is $20 - x$. Their product $p(x) = x(20 - x)$.

Find the maximum value of p . Find $k = 100$

Let $x = 1^{\text{st}}$ num
 $20 - x = 2^{\text{nd}}$ num

$$P(x) = x(20 - x)$$
$$P(x) = 20x - x^2$$

Find h $\left\{ \begin{array}{l} 0 = 20 - 2x \\ 2x = 20 \\ x = 10 \rightarrow h \end{array} \right.$ Find k $\rightarrow P(10) = 10(20 - 10) = 10(10) = 100 = k$

9) A charter company will provide a plane for a fare of \$60 each for 20 or fewer passengers. For each passenger in excess of 20, the fare is decreased \$2 per person for everyone. What number of passengers will produce the greatest revenue for the company?

Let $x = \#$ passengers over 20. Find h

Revenue = (Fare) \times (passengers) = S

$$R(x) = (60 - 2x)(20 + x)$$

$$R(x) = 1200 + 60x - 40x - 2x^2$$

$$R(x) = 1200 + 20x - 2x^2$$
$$= -2x^2 + 20x + 1200$$

5. 25
 $R(x) = -4x + 20$

$$0 = -4x + 20$$

$$4x = 20$$

$$x = 5 = h$$

$$20 + 5 = 25$$

Assignment:

Pg. 343

2, 5, 6, 10, 12, 13, 15