Real world quadratic functions

Science, Mathematics



Real World Quadratic Functions MAT 222 Week 4 Assignment Real World Quadratic Functions A quadratic function has theform , where, a, b and c are real numbers with a \neq 0. For solving a quadratic function, rules for order of operations, solving equations, exponents, and radicals are used. The graph of a quadratic function is given by a parabola that opens either upward or downward. When the parabola opens downward, the vertex is the point where the relative minimum of the function occurs and when the parabola opens upward, the vertex is the point where the relative maximum of the function occurs. The daily profit, P of a chain store is related to the number of clerks working that day, x, and is given by the function (Dugopolski, 2012). This paper will determine the maximum possible profit for the chain store and the number of clerks that will maximize the profit.

The x-intercepts of the profit function (parabola) can be found by solving .

Dividing both sides by -25

Factoring the left side.

Using Zero Factor Property

or Solving each equation.

x = 0 or x = 12

The parabola will cross the x-axis at 0 and 12. The value of a = -25 is large and negative, indicating that the parabola will be narrow and will open downward. This means that the maximum value will be at the vertex. The xvalue for the vertex of the parabola is given by , where a = -25 and b = 300. What number of clerks will maximize the profit?

6 clerks will maximize the profit.

What is the maximum possible profit?

Putting x = 6

The maximum possible profit is \$900 for 6 clerks working.

A table of values for the number of clerks, x and profit, P is given by:

875

900 875

800

675

- 500
- 275

0

Figure 1 shows the graph of the Profit function, . The graph of the profit function is a parabola with vertex at (6, 900). As shown in the graph, there will be no profit made when no clerk is working or when 12 clerks are working, and there will be loss if more than 12 clerks are working.. The maximum profit will occur when 6 clerks are working and will be equal to \$900. The graph of the profit function is only relevant in the first quadrant, as the value of the x cannot be negative that is negative clerks cannot exist. Figure 1: Graph of the profit function,

In conclusion, the daily profit, P of a chain store is related to the number of clerks working that day, x, and is given by the function . This paper used quadratic function to determine the maximum possible profit for the chain store and the number of clerks that will maximize the profit. The graph of the profit function (and also solution) indicated that the maximum profit would occur when 6 clerks are working and would be equal to \$900. The graph also indicated that there would be no profit made when no clerk is working or when 12 clerks are working, and there will be loss if more than 12 clerks are working. Therefore, the store manager should employ 6 clerks to achieve

maximum possible profit at the store.

Reference

Dugopolski, M. (2012). Elementary and intermediate algebra (4th ed.). New

York, NY: McGraw-Hill Publishing.