

Name: _____

Note: When transforming expressions into equivalent forms, write a chain of equalities. Don't just write one expression after the next without stating the relationship between the expressions.

When solving equations, write down one equation after another. Do not cross out or write on top of an equation.

1. A manufacturer finds that the revenue generated by selling x units of a certain commodity is given by the function $R(x) = 60x - 0.4x^2$, where the revenue is measured in dollars.

(a) What is the maximum revenue?

Solution: Put the parabola into standard form:

$$\begin{aligned} R(x) &= -0.4(x^2 - 150x) \\ &= -0.4(x^2 - 150 + 5625 - 5625) \\ &= -0.4(x^2 - 150 + 5625) + (-0.4)(-5625) \\ &= -0.45(x - 75)^2 + 2250 \end{aligned}$$

The extreme point on the parabola is $(75, 2250)$.

So, the maximum revenue generated is \$2250.

(b) How many units should be manufactured to obtain this maximum revenue?

Solution: The number of units where the maximum occurs is 75.