Section 1.1, Question 47: Let $C(x) = 12x + 1100$ denote the total cost (in dollars) of manufacturing x units of a certain commodity per day.
a. What is the total cost if the production is set at 10 units per day?
b. What is the marginal cost?
c. Use part b. to determine the additional cost of raising the daily production level from 10 to 11 units.

Answer: **a**. The function $C(x) = 12x + 1100$ gives us the total cost of production per day, where x is the number of units produced. To find the total cost of producing 10 units per day, we can set $x = 10$ in the above equation to get

$$C(10) = 12(10) + 1100 = 120 + 1100 = 1220.$$

So, the total cost of producing 10 units per day is \$1220.

b. The marginal cost is defined to be the additional cost of producing an extra unit of output. [See example 1 on page 56 of your textbook for this definition.]

If current production is at level x, the cost of producing an additional unit is the difference between $C(x + 1)$ and $C(x)$, or $C(x + 1) - C(x)$.

We have that $C(x + 1) = 12(x + 1) + 1100 = 12x + 12 + 1100$, and that $C(x) = 12x + 1100$. Therefore the difference is $C(x + 1) - C(x) = (12x + 12 + 1100) - (12x + 1100) = 12$.

So, the marginal cost is \$12.

c. The additional cost of raising the daily production level from 10 to 11 units is the same as the marginal cost, which we have found to be \$12.

Note that the marginal cost in this question does not depend on the level of production: the additional cost is \$12 whether production is at 10 units or 1000 units.

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