MARGINAL ANALYSIS

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Suppose the function below shows the cost in dollars to manufacture *x* portable CD players.

$$C(x) = -0.0001x^2 + 20x + 150,000$$

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$$C(50,000) = -0.0001(50,000^2) + 20(50,000) + 150,000$$

$$= \$900,000$$

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$$C'(50,000) = -0.0002(50,000) + 20$$

$$= -10 + 20 = 10 \text{ dollars per CD}$$

Use this result to estimate the cost of producing 50,001 CDs.

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What is the actual cost of producing 50,001 CDs?

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Given the cost and revenue functions below for refurbishing *x* ipods, find the marginal profit.

$$C(x) = 0.25x^2 + 40x + 1000 \text{ dollars}$$

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$$= 80x - (0.25x^2 + 40x + 1000)$$

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$$P'(x) = \frac{dP}{dx} = -0.5x + 40 \ \frac{\text{dollars}}{\text{ipod}}$$

What is the marginal profit on refurbishing 20 ipods?

$$C(x) = 0.25x^2 + 40x + 1000 \text{ dollars}$$

$$R(x) = 80x \text{ dollars}$$

$$\text{Profit} = \text{Revenue} - \text{Cost} = R(x) - C(x)$$

$$= 80x - (0.25x^2 + 40x + 1000)$$

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What is the marginal profit on refurbishing 20 ipods?

$$P'(x) = \frac{dP}{dx} = -0.5x + 40 \ \frac{\text{dollars}}{\text{ipod}}$$

$$P'(20) = -0.5(20) + 40 = 30 \ \frac{\text{dollars}}{\text{ipod}}$$

Estimate the profit on refurbishing 21 ipods.

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$$P'(20) = -0.5(20) + 40 = 30 \ \frac{\text{dollars}}{\text{ipod}}$$

$$P(20) = -0.25(20^2) + 40(20) - 1000 = -300 \text{ dollars}$$

$$P(21) \approx -300 + 30 = -270 \text{ dollars}$$

What is the actual profit on refurbishing 21 ipods?

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$$P(21) = -0.25(21^2) + 40(21) - 1000 = -270.25 \text{ dollars}$$