A Problem

\[ C = 5 + 10q^2 \]

- Find TC, AC, and MC when \( q = 10 \)
- Find where MC = AC
- What level of output minimizes AC?
- When is MC = 60?

Finding TC, AC and MC (\( q = 10 \))

\[ C = 5 + 10q^2 \]

\[ TC = 5 + 10(10)^2 \]
\[ TC = 5 + 10(100) = 1005 \]

Finding AC

\[ C = 5 + 10q^2 \]

\[ AC = \frac{TC}{q} = \frac{1005}{10} = 100.5 \]
Finding AC

\[ C = 5 + 10q^2 \]

\[ AC = \frac{C(q)}{q} \]
\[ AC = \frac{5 + 10q^2}{q} \]
\[ AC = \frac{5}{q} + 10q \]
\[ AC = \frac{5}{10} + 10(10) = 100.5 \]

Finding MC

\[ C = 5 + 10q^2 \]

The derivative of \( ax^2 + bx + c \) is 
\[ 2ax + b \]

Finding MC

\[ C = 5 + 10q^2 \]

The derivative of \( ax^2 + bx + c \) is 
\[ 2ax + b \]
\[ MC = 20q \]
\[ MC = 200 \]

Find where MC = AC

\[ C = 5 + 10q^2 \]
\[ AC = \frac{5}{q} + 10q \]
\[ MC = 20q \]
Find where $MC = AC$

$C = 5 + 10q^2$

$AC = \frac{5}{q} + 10q$

$MC = 20q$

$\frac{5}{q} + 10Q = 20q$

Solving the Problem

The Last Step

$C = 5 + 10q^2$

Find where $MC = AC$

$\frac{5}{q} = 10q$

$q = 0.5 \approx 0.707$

Solving the Problem

Minimizing AC

$C = 5 + 10q^2$

Solving the Problem

Minimizing AC

$C = 5 + 10q^2$

$AC = \frac{5}{q} + 10q$

Solving the Problem

Method I

$C = 5 + 10q^2$

Solving the Problem
Solving the Problem

Method I

\[ C = 5 + 10q^2 \]

\[ AC = \frac{5}{q} + 10q \]

\[ \frac{dAC}{dq} = -\frac{5}{q^2} + 10 = 0 \]

When \( MC = 60 \)

\[ C = 5 + 10q^2 \]

When is \( MC = 60 \)?

\[ MC = 20q \]

\[ 20q = 60 \]

\[ q = 3 \]

Method II

\[ C = 5 + 10q^2 \]

\[ -\frac{5}{q^2} + 10 = 0 \]

\[ 10q^2 = 5 \]

\[ q \approx 0.707 \]

\[ MC = AC \]

\[ q = \frac{1}{2} \sqrt{2} \approx 0.707 \]
A Tabular Solution

\[ C = 5 + 10q^2 \]

- Compute TC, AC, and MC when \( q = 10 \)
- Find where MC = AC
- What level of output minimizes AC?
- When is MC = 60?

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</table>

Left for you to do

End

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