Monopoly:

This is a situation where a single producer (firm) is the sole producer of a good that has no close substitutes.

Sources of Monopoly:

♣ The firm may control the entire supply of raw materials required to produce that output.
♣ The firm may have a patent or copyright.
♣ The case of “Natural Monopoly”. Economies of Scale may permit only one firm to be efficient in the market.
♣ The case of Government Franchises.
♣ Through Mergers and Acquisitions.
Characteristics of Monopoly:

- A single seller: A single firm produces all industry output. The monopoly is the industry.
- Entry into the industry is totally blocked.
- Imperfect dissemination of information: Cost, price, and product quality information are withheld from uninformed buyers.

\[ TR_2 = 8(2) = 16 \quad AR_2 = 8 = P \]
\[ TR_3 = 7(3) = 21 \quad AR_3 = 7 = P \]
\[ MR_3 = TR_3 - TR_2 = 21 - 16 = 5 \]

\[ AR = P = a - bQ \]
\[ TR = PQ = aQ - bQ^2 \]
\[ MR = \frac{\partial TR}{\partial Q} = a - 2bQ \]
Find the Profit maximizing output from the following information.

<table>
<thead>
<tr>
<th>Demand Information</th>
<th>Cost Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Q</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
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<tr>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Profit = TR - TC = 32 - 19 = 13

\[ TR = 300Q - 0.001Q^2 \]
\[ TC = 9,000,000 + 0.0004Q^2 \]
MR = \frac{\partial TR}{\partial Q} = 300 - 0.002Q
MC = \frac{\partial TC}{\partial Q} = 20 - 0.0008Q

300 - 0.002Q = 20 + 0.0008Q
\Rightarrow 0.00028Q = 280
\Rightarrow Q^* = \frac{280}{0.00028} = 100,000

MR = MC
P = AR = \frac{TR}{Q} = 300 - 0.001Q
\Rightarrow P = 300 - 0.001 \times 100,000
\Rightarrow P^* = 200

\pi = TR - TC
TR = 20,000,000
TC = 5,000,000
\pi^* = 15,000,000

Part b:

\[ TR = 15Q - 0.00005Q^2 \]
\[ MC = 5 \]

\[ MR = \frac{\partial TR}{\partial Q} = 15 - 0.000001Q \]
MR = MC
\Rightarrow 15 - 0.000001Q = 5
\Rightarrow Q = \frac{10}{0.00001} = 1,000,000

\[ P = AR = \frac{TR}{Q} = 15 - 0.00005Q \]
\Rightarrow P = 15 - 0.00005(1,000,000) = 10

Part b:

\[ TR = 10,000,000 \]
\[ \pi = 5,000,000 \]

\[ P = MC = 5 \]
\[ \pi = 0 \]
\[ P = 5 = AR = \frac{TR}{Q} = \frac{10,000,000}{2,000,000} = 5 \]