

Exercise Set 14
MONOPOLY

III. Questions

ALL GRAPHS ARE IN FIG. 1 AT THE END.

1. Select values for the parameters: **a = 30, F = 60.** (Note: a should be less than 150.)

2. Sketch the demand curve.

$$\text{Equation: } P = 150 - 1.5Q$$

3. Obtain the marginal revenue function. Sketch the MR curve.

$MR = 150 - 3Q$ (note: twice as steep as demand, and the vertical intercept is the same as that for demand.)

4. The slope of the MR curve is [half / same as / twice] the slope of the demand curve.

Twice.

5. Sketch the MC and AC curves.

6. In order to maximize profits, the firm will produce _____ units of output and sell them at a price of \$ _____ each. Explain how you obtained these values. Indicate the optimal point on the graph.

At the optimal output: $MR = MC$

$$150 - 3Q = 30 + 4Q$$

$$7Q = 120$$

$$Q = 17.14$$

Obtain the optimal price from the demand curve.

$$\begin{aligned} P &= 150 - 1.5Q \\ &= 150 - 1.5(17.14) \\ &= 124.29 \end{aligned}$$

7. At the optimal point, we conclude that Price is [greater than / equal to / less than] Average Cost. Explain.

$$AC = a + 2Q + F/Q = 30 + 2(17.14) + 60/(17.14) = 67.78$$

Price is greater than Average cost.

$$\text{Note: Profit per unit} = P - AC = 124.29 - 67.78 = 56.51$$

8. The price charged by the firm is [above / below / same as] the marginal revenue and [above / below / same as] the marginal cost.

$$MR = 150 - 3Q = 150 - 3(17.14) = 98.58. \text{ This is less than Price.}$$

$MC = 30 + 4Q = 30 + 4(17.14) = 98.56$. Same as MR (except for rounding error). Also less than Price.

9. The firm's maximum profit is \$ _____.

$$TR = P \times Q = \$2130.69$$

$$TC = 30(17.14) + 2(17.14)^2 + 60 = 1161.76$$

$$\text{Profit} = TR - TC = 968.93 \text{ (due to rounding, numbers may not match those on the website.)}$$

10. If the firm's fixed costs fall, the firm [will raise / will lower / will not change] its price and it will produce [more / less / the same] output. Explain.

No change in output, since $MR = MC$ has not been affected.

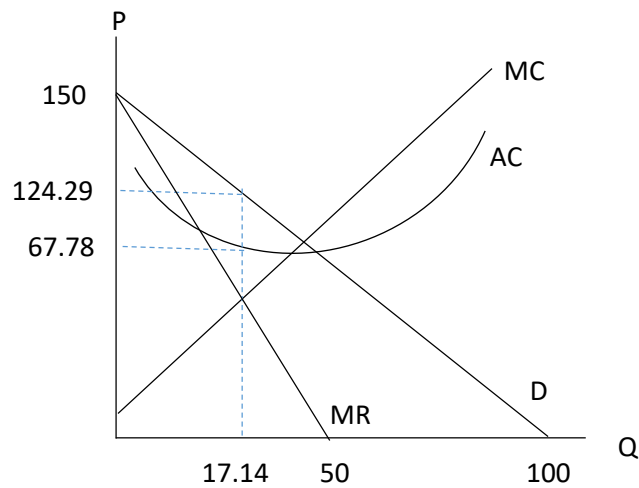
No change in price, since output has not been affected.

11. If the firm's marginal costs rise, the firm [will raise / will lower / will not change] its price and it will produce [more / less / the same] output. Explain. [Hint: How do you interpret an increase in a?]

Output will fall (from $MR = MC$)

Price will increase, since output has fallen (see demand curve).

Fig. 1



To find optimal output:

Set $MR = MC$. This yields $Q = 17.14$.

To find price:

Read off the price from the demand curve. This yields $P = 124.29$.

The average cost at the optimal output is 67.78.