

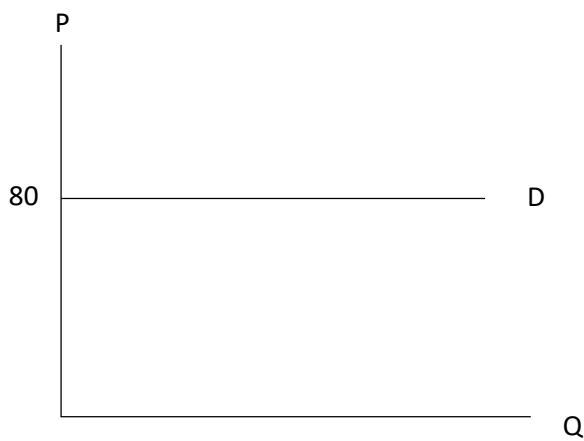
Exercise Set 13
PERFECT COMPETITION

III. Questions

1. Select values for P , a , b and F . Sketch the demand curve facing the perfectly-competitive firm.

$P = 80, a = 15, b = 2, F = 70.$

Fig. 1



2. The horizontal demand curve for the firm's output implies that demand is [perfectly elastic / perfectly inelastic / unit-elastic].

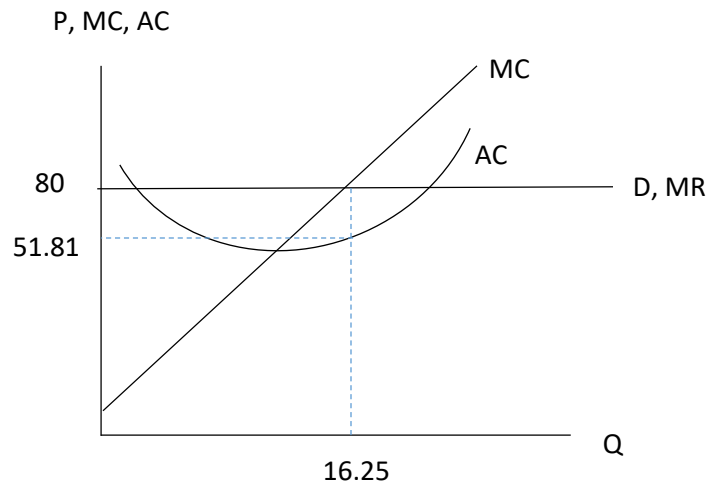
Perfectly elastic. Elasticity of demand is infinite.

3. Sketch the MC and AC curves. Determine and indicate the optimal output (Q^*).

At the optimal point: $P = MC$

$$80 = 15 + 4Q$$

$$Q = 16.25$$



4. Compute the firm's total revenue, total cost and profit at Q^* . Indicate the corresponding "rectangular areas" on the graph.

$$TR = P \times Q^* = 80(16.25) = \$1300$$

$$TC = 15(16.25) + 2(16.25)^2 + 70 = \$841.88$$

$$\text{Profit} = TR - TC = \$458.12$$

$$\text{Average cost at } Q^*: AC = a + bQ + F/Q = 15 + 2(16.25) + 70/(16.25) = 51.81$$

$$\text{Also, } TC = AC \times Q = 51.81(16.25)$$

$$\text{Profit per unit} = P - AC = 80 - 51.81 = 28.19$$

5. Suppose the market price increases by 20%. Find the new Q^* and profit.

$$\text{New } P = 1.2(80) = 96$$

To find optimal output, set $P = MC$.

$$96 = 15 + 4Q$$

$$Q = 20.25$$

6. Derive a positively-sloped supply curve for the firm.

Select different values of P . Find corresponding output (using $P = MC$). Sketch P vs Q .

7. A decrease in the firm's fixed costs will cause the firm to produce [more / less / the same] output. Explain.

Same output.

There is no fixed cost term in MC . Therefore, $P = MC$ will yield the same output.

8. A firm will continue to operate in the short run even if it makes a loss. Using an appropriate value for P , explain when that is true. Provide a sketch.

Suppose $P = 25$.

Using $P = MC$, the optimal output is 2.5.

At this output, profit = -57.50, a loss!

But this loss is smaller than the fixed cost of 70. Therefore, it is better for the firm to continue operating in the short run.

However, if the price fell to 10, the loss under operation would exceed the fixed cost. In this case, it is better for the firm to shut down.