

Discussion 9

Important Topics

- Short and Long Run Equilibrium
- Input Markets

Quick Review

1 What is the fixed cost for a firm with costs $TC = 5 + \frac{5+5q+5q^2}{q+1}$?

2 A firm should operate in the short run only when it can cover its ...

- Variable costs
- Fixed costs
- Total costs

Exercise 1 Find the short run supply curve for a firm with $TC = 10 + 10\sqrt{q} + 5q^2$ and $MC = 10q + \frac{5}{\sqrt{q}}$.

Exercise 2 Initially, the hoverboard market is served by 10 firms. Suppose all firms are identical and face the following costs and market demand:

$$MC = 10 + 10q$$

$$TC = 20 + 10q + 5q^2$$

$$Q^D = 30 - P$$

- What is the market supply curve?
- Draw the usual graphs (demand, costs, etc) for the individual firm and the market. Label the break-even and shutdown prices. What is the short run equilibrium price and quantity?
- How much does each firm produce? Will any firms exit in the short run?
- Is this a long run equilibrium? Find the long run equilibrium price and quantity.
- How many firms will be in the market in the long run?

Exercise 3 The market for plastic chairs in Madison is perfectly competitive. The market demand for plastic chairs is given as $P = 130 - Q$. The market supply for plastic chairs is given as $P = 2 + Q$.

- Determine the equilibrium quantity and price for this plastic chair market. Each firm faces the cost functions $TC = 4q^2 + 2q + 64$ and $MC = 8q + 2$.
- What are the break-even price and the shut-down prices for a representative firm in the short run?

- c.) At the current equilibrium price, what is the quantity of chairs provided by a representative firm? Calculate a representative firm's profit.
- d.) How many firms are in the market in the short run?
- e.) What is the long-run profit maximizing level of output for a representative firm? What is the long-run profit?
- f.) What is the long-run equilibrium price in the market?
- g.) How many firms are in the market in the long run?

Exercise 4 If profits are negative in the short run in a perfectly competitive industry, which of the following would you not expect to happen as the market moves to the long run (assuming no external economies or external diseconomies of scale)?

- a.) The market price will increase.
- b.) Firms will exit the market.
- c.) Total market output will fall.
- d.) Each firm's individual demand curve will shift down.

Exercise 5 Consider the following information for a T-shirt manufacturing firm that can sell as many T-shirts as it wants for \$3 per shirt.

Number of Workers	Quantity of Shirts	MPL	TR	MRPL
0	0			
1	30			
2	80			
3	110			
4	135			
5		20		
6	170			
7				30
8				15

- a.) Fill in all the blanks in the table.
- b.) Verify that MRPL for this firm can be calculated in two ways: (1) change in the TR from adding another worker and (2) MPL times the price of the output.
- c.) If this firm must pay a wage rate of \$40 per worker per day, how many workers should be hired now? Why?
- d.) Suppose the wage rate rises to \$50 per worker. How many workers should be hired now?
- e.) Suppose the firm adopts a new technology that doubles output at each level of employment and the price of shirts remains at \$3. What is the effect of this new technology on MPL and MPRL? At a wage of \$50, how many workers should the firm hire now?