Which of the following events will induce firms to enter an industry? Which will induce firms to exit? When will entry or exit cease? Explain your answer.

a) A technological advance lowers the fixed cost of production of every firm in the industry.

b) The wages paid to workers in the industry go up for an extended period of time.

c) A permanent change in consumer tastes increases the demand for the good.

d) The price of a key input rises due to a long-term shortage of that input.

1. **Entry:** lower fixed costs give an incentive to new firms to enter the industry. However, when price equals the breakeven price (minATC), which means zero profit, the industry reaches equilibrium and there is no more incentive for firms to enter the market, therefore entry will cease.
2. **Exit:** wages constitute a variable cost that the firm can avoid. Therefore, if the price of wages increase the firm will incur a loss and will exit the industry. With decreased production, prices rise and this leads to a reduction of losses. When losses go back to zero (break even price), the exit will cease.
3. **Entry:** increased demand leads to new firms to enter the industry. More firms means increased output and, consequently, decreased prices and decreased profits. Therefore, entry will cease when profits return to zero.
4. **Exit:** the shortage of a key input and the consequent rise in its price causes variable cost (and, as a result, total cost) to increase. Consequently, firms incur a loss and will have an incentive to exit the market. However, the presence of less firms in the industry leads to decreased output and higher prices and, as a result, losses will decrease. Exit will cease when losses are back to zero.

Compare the short-run and the long-run industry supply curves. Which one is flatter? Why?

The long run industry supply curve will be more elastic and therefore flatter than the short run one, due to entry and exit: an increase in demand leads to the entrance of new producers and, in turn, to higher industrial production. However, a rise in output leads to a fall in price, which causes existing firms to exit the industry. Less firms in the industry means a reduced industry output and, eventually, a new increase in price. The point here is that entry and exit leads to higher sensitivity to changes in price, with firms being more able to adapt and modify their cost structure in the long run.

In a competitive market, a firm produces T-shirts and operates with the following cost function:

TC(q)=72+12q+4q2

The market price for T-shirt is P=44

a) Define ATC, AVC, and MC and represent graphically the related curves.

b) Define the optimal quantity the firm will decide to produce.

c) Define the supply curve in the short run and represent it graphically. Which is the minimum level of P which will induce the firm to stay in the market?

d) Suppose that 1000 firms operate in the market for T-shirt, all characterized by the same technology and by the same cost structure. Define the industry supply curve in the short run (int. define first the DIRECT individual firm supply curve and then multiply it by the total number of firms in the market).

1. See file.
2. See file.
3. The short run supply curve corresponds to the marginal cost curve for prices equal or above the shutdown price (minAVC) and to the vertical segment lying on the vertical axis for prices below the shutdown price, since the firm shuts down and output is equal to zero (see file). In the short run, the firm will stay in the market if the price is equal or above the shutdown price (12 in this case), which guarantees that it covers all the variable costs and at least some of the fixed costs. In fact, in the short run the firm still has to cover the fixed costs, so if it exited the market it would incur even a greater loss. The indirect supply function will be obtained by equalizing the marginal cost function to the variable P, so it will be P = 8Q + 12 for prices equal or above the shutdown price, yet output will be equal to 0 for prices below the shutdown price.
4. See file.

Explain why the Average Total Cost Curve is downward sloping for small quantity of output produced and upward sloping for large quantity of output produced.

Average total cost results from the sum of two components: average fixed cost (fixed cost per unit of output) and average variable cost (variable cost per unit of output). As output increases, these two components move in opposite directions as the result of two opposite effects:

* According to the **spreading effect**, the fixed cost is spread over more units of output, leading to a lower average fixed cost.
* According to the **diminishing** **returns effect**, the variable cost rises as more units of output are produced, since more variable input is required to produce these additional units. As a result, average variable cost increases as output increases.

At low levels of production, the spreading effect outweighs the diminishing returns effect because even a small increase in output causes the average fixed cost to decline, so the average cost curve is downward sloping. However, as output increases the diminishing returns effect dominates the spreading effect, which becomes less powerful because AFC is already small; as a result, for high levels of production the ATC curve is upward sloping. The only point at which the two effects exactly balance each other is at the minimum average total cost, namely at the bottom of the U-shaped curve.