NAME: ___KEY___   11/03/15 (Week 11)
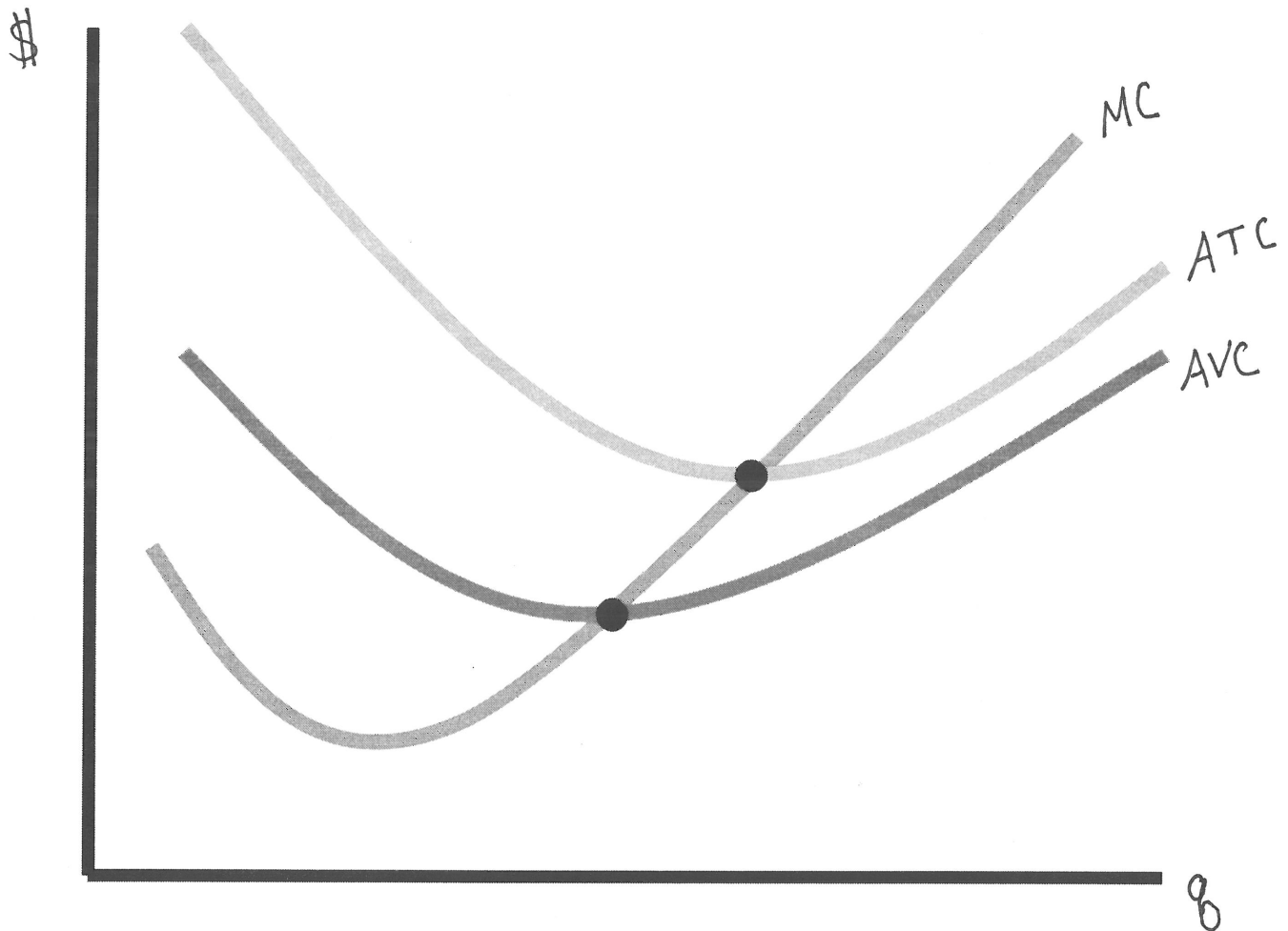
The graph shows an average total cost (ATC), average variable costs (AVC), and marginal cost (MC) curve. Label each curve and the axes.

$ (y-axis), q (x-axis)

Curves labeled: MC, ATC, AVC

marginal cost often has the Nike check type shape.
It cross both ATC & AVC at their minimum (lowest)
values (if they have one). AVC is always below ATC,
because ATC includes the AVC plus the average
fixed costs. If there were no fixed costs the
two would be the same.

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A firm has the following linear production function: $Q = 2L$. It's fixed costs (FC) are $400. In addition to the cost of labor, the firm as variable costs of $1.5 for each unit of output it produces. Assume the firm pays workers $10 per unit of output.
- Write an equation for the firms variable costs (VC), and an equation for the firms total costs (TC).
- Draw a graph showing the firms total cost (TC) curve.
- Find the firms average total cost (ATC), average variable cost (AVC), and marginal cost (MC).
- Draw a graph showing what the average total cost (ATC) curve and marginal cost (MC) curve look like.

To find the variable cost of labor, use the production function & solve for L. Then multiply what you get for L by the wage.

$$Q = 2L$$
$$L = Q/2$$

So variable cost is:

$$\boxed{VC = 10 \cdot Q/2 + 1.5Q}$$

$$10 \cdot Q/2 = 10/2 \, Q = 5Q$$
$$5Q + 1.5Q = 6.5Q$$
So $\underline{VC = 6.5Q}$

$$TC = FC + VC = \boxed{400 + 10 \cdot Q/2 + 1.5Q}. \text{ This simplifies to:}$$
$$\underline{TC = 400 + 6.5Q}$$

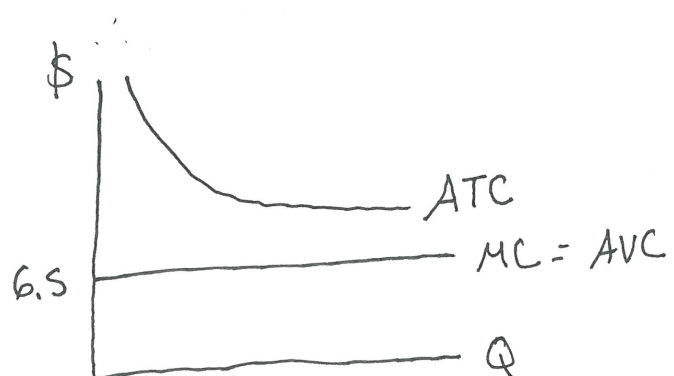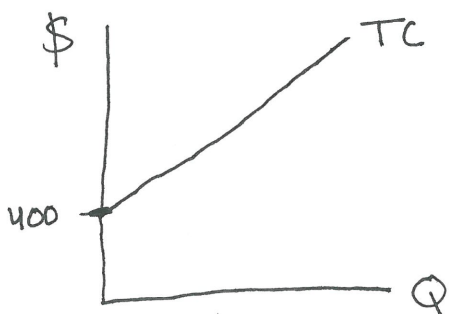To find ATC, divide everything in TC by Q. To find AVC, divide everything in VC by Q.

$$ATC = \frac{TC}{Q} = \frac{400}{Q} + \frac{6.5Q}{Q} = \boxed{\frac{400}{Q} + 6.5}$$

$$AVC = \frac{VC}{Q} = \frac{6.5Q}{Q} = \boxed{6.5}$$

For this type of cost structure, MC is constant & equals AVC. This will not always be true.

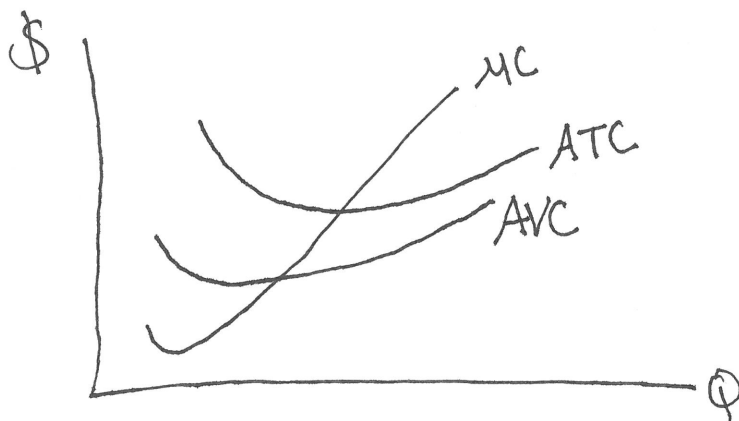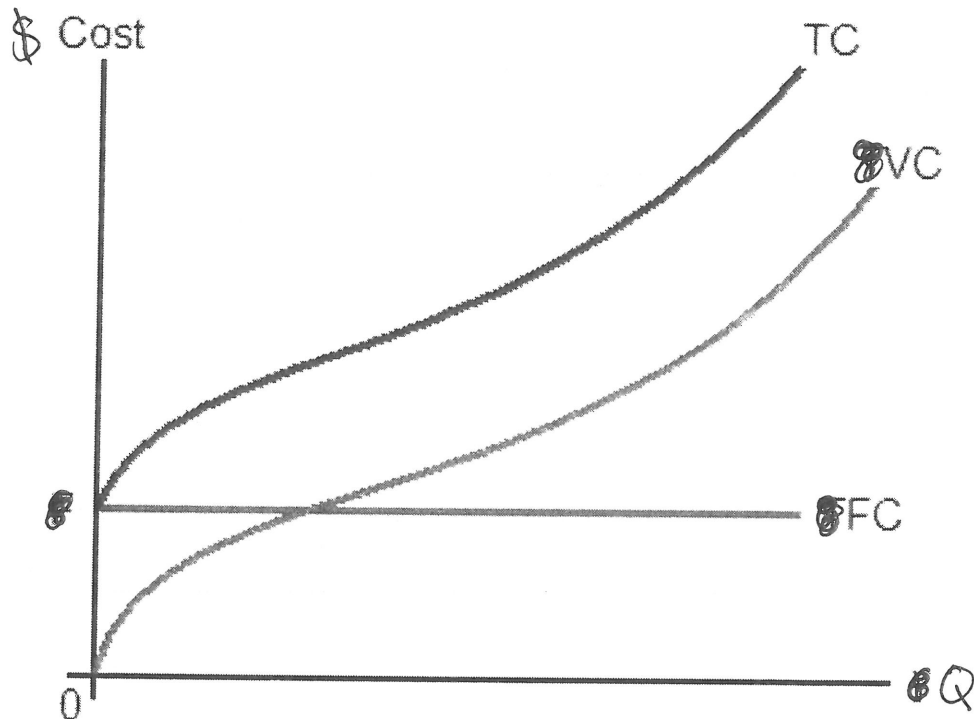$$\boxed{MC = 6.5}$$

NAME: KEY

Sketch the average total cost (ATC), average variable cost (AVC), and marginal cost (MC) for a firm that has the type of total costs shown below. Do this on a separate graph (not the one given). Just show the basic shapes, don't worry about trying to match it up perfectly with the graph that's given.


This would be the general shapes, compare these graphs to the ones in the prior problem. And remember to be careful when drawing them because they can look different in different cases.

NAME: KEY   11/03/15 (Week 11)

The graph shows an average total cost (ATC), average variable costs (AVC), and marginal cost (MC) curve. Assume there's a perfectly competitive market.
- Draw a horizontal line, representing a price level that would result in this firm making a positive economic profit, and show what quantity the firm would produce at that price.
- Draw another line, representing a price level that would result in this firm making an economic loss, but not exiting the market in the short-run, and show the quantity the firm would produce at that price.
- Explain why a firm would remain open in the short-run despite making an economic loss.
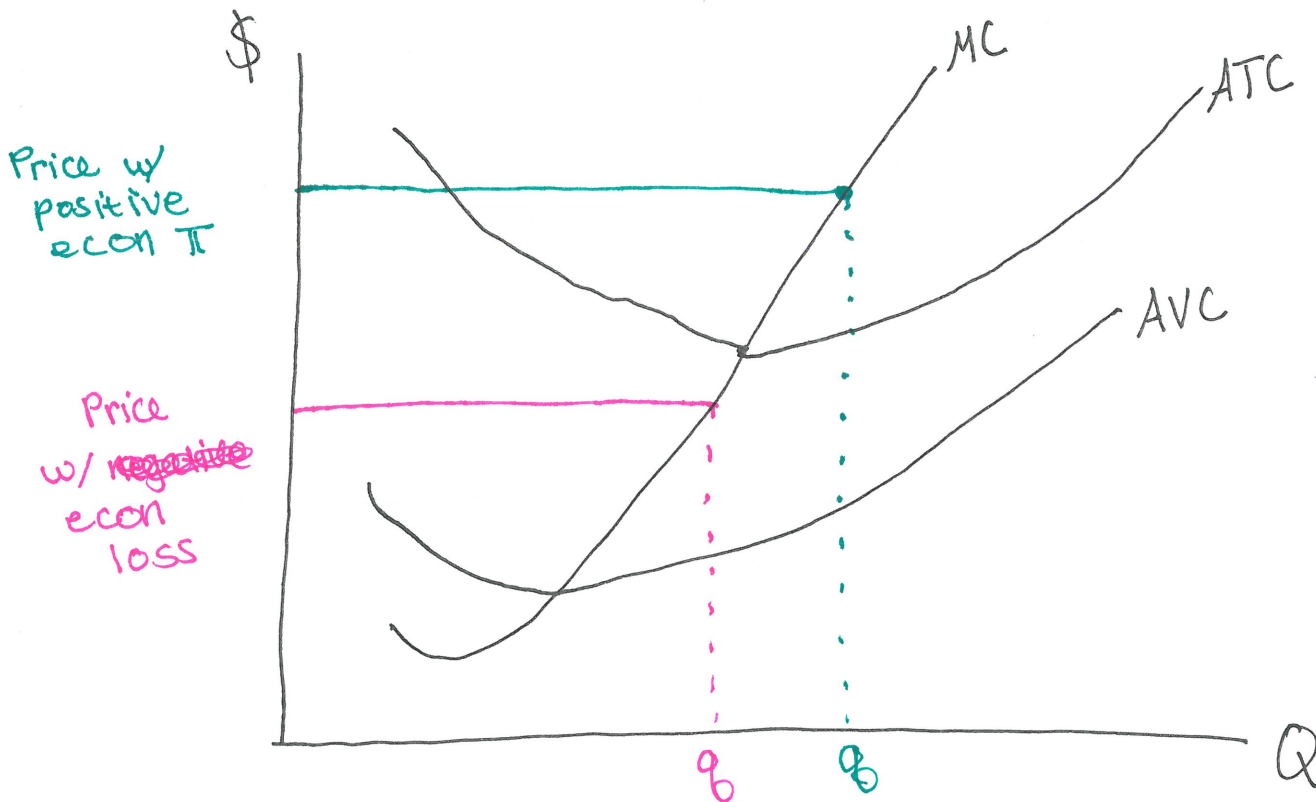
In a perfectly competitive market, price is equal to the firms marginal revenue. The firm will pick the quantity that makes its marginal cost equal to its marginal revenue & produce that quantity. If MC is greater than ATC at the quantity a firm produces it makes positive econ profit.

If the MC is less than the ATC the firm will have an economic loss. As long as the MC is greater than the AVC, the firm won't exit in the short run. The reason is because they would still have to pay fixed costs & w/ MC > AVC they make enough to pay FC plus some VC.

The graph on the left shows the market for vegan dragon food. It's a perfectly competitive market. The graph on the right shows the average total cost (ATC), average variable cost (AVC), and marginal cost (MC) curves of an individual producer in that market. Label everything. Show on the cost curve graph what quantity the individual firm will produce.
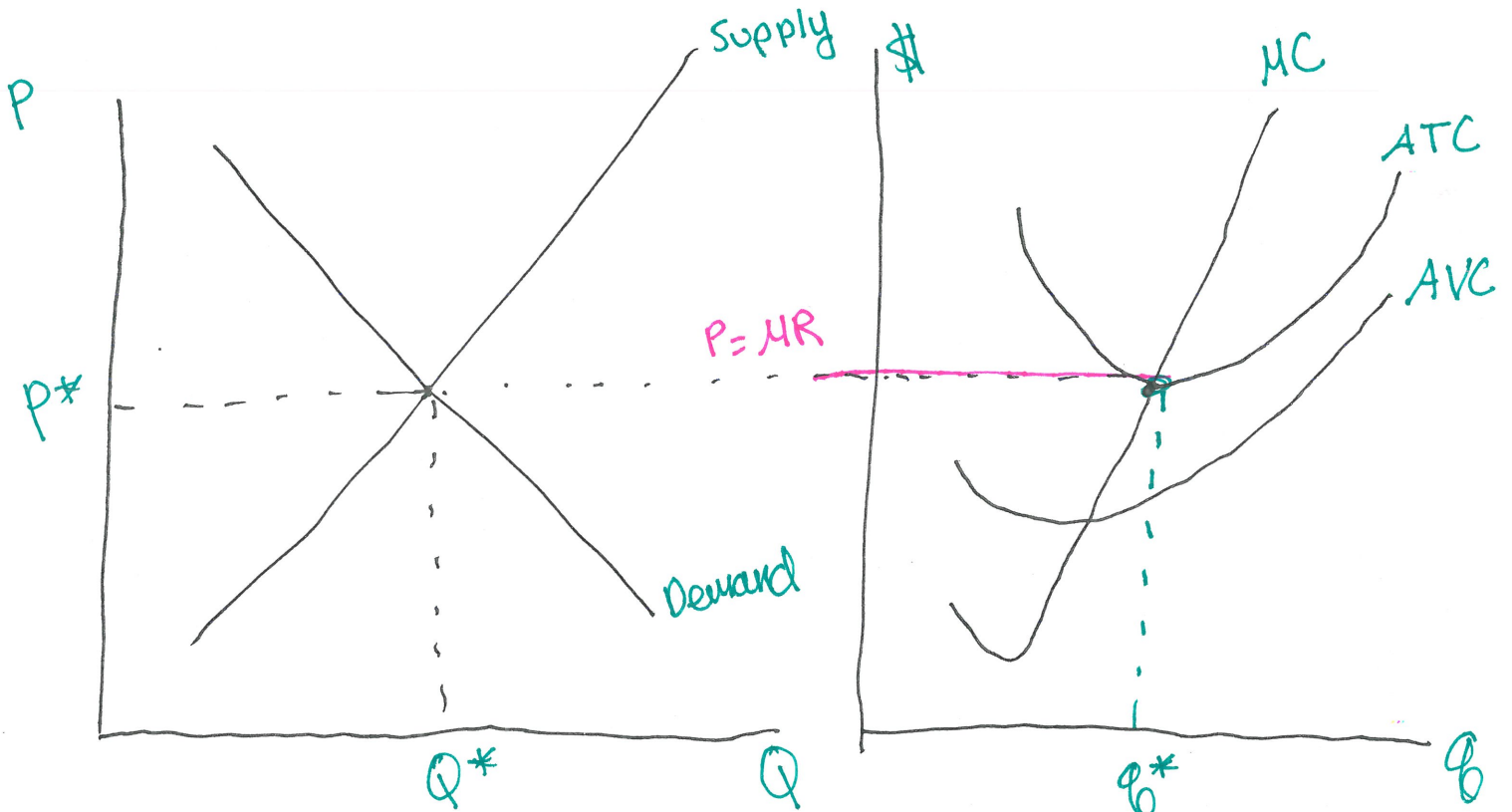

In a perfectly competitive market, marginal revenue (MR) is equal to market price. Firms maximize profit by producing the q level where MR = MC. In a long run equilibrium, this will always end up being where MC & ATC cross.

An individual firm will produce this quantity. The lower case q is used to indicate it's for one producer. The upper case market Q is what you get when you add up all the individual producer q's.

Now, imagine the market starts off in a long run equilibrium, but then there's a major decrease in the price of vegan dragons, a complement for vegan dragon food. As a reminder, this decrease in the price of a complement will cause the demand for vegan dragon food to increase (meaning the demand curve shifts right). First show and explain what will happen in the short run. Then show and explain what will happen in the long run.
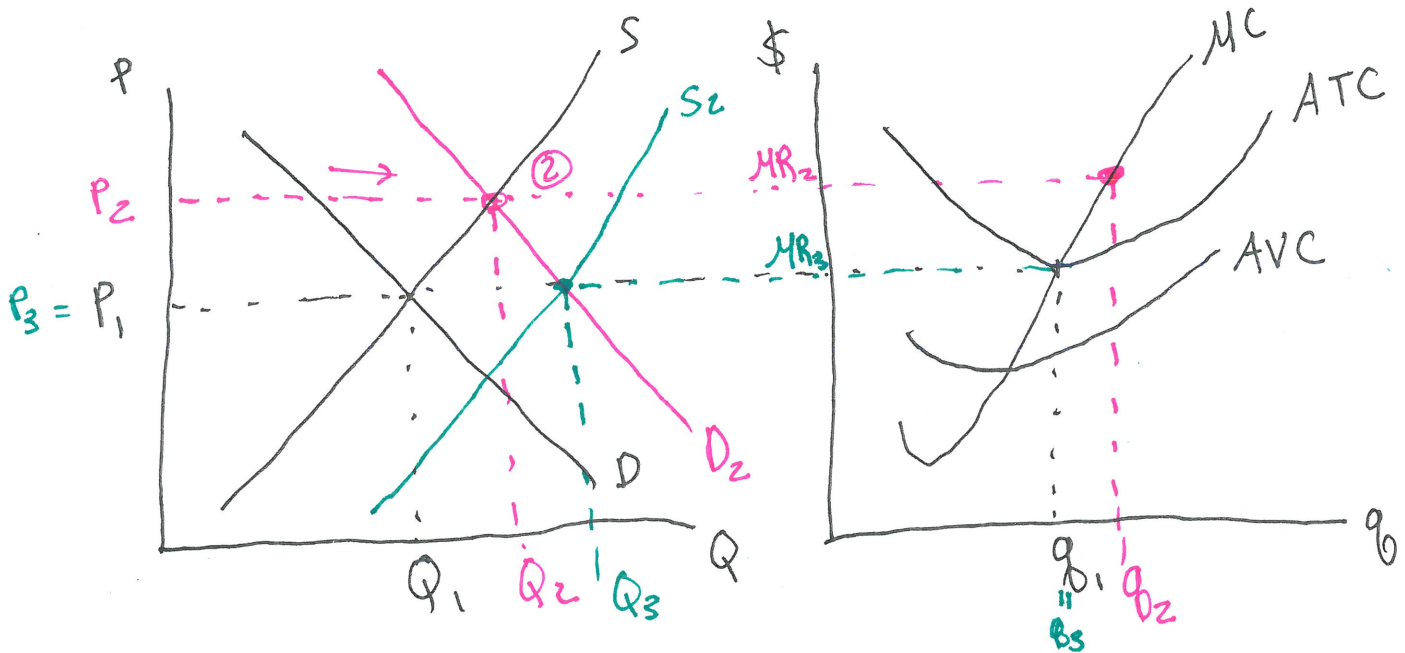
When demand increases, the market price ↑s to P_2. Since a firm marginal revenue equals price, MR also ↑s. The ↑ in MR, will ↑ individual firm production to q_2. Since MR & MC are greater than ATC firms will be making positive economic profit. This is a short run equilibrium.

Over time, the econ profit will attract new firms to enter the market. Firms entering the market causes the supply curve to shift right (remeber from earlier in the semester, that the number of producers is one of the things that shifts supply). AS supply increases, the market price ($ so also a firms MR) decreases. Firms keep entering the market until supply gets to S_2 at which point there's no longer a econ. profit.