Problem Set 1
(ANSWERS)

I. Multiple Choice Questions

1. b) WHY? A increase in the size of the labor force means that there are more resources in the economy, implying more outputs can be produced. If more of everything can be produced, then the PPF will shift out.

2. a) WHY? A movement along the demand curve will be caused by a shift in the supply curve. A rightward movement means supply must shift out. A decrease in the price of inputs can cause supply to shift out, and milk is an input to ice cream. (Alternatively, one might think of a cows as the input and think of milk and ice cream as substitute production goods. If the price of a substitute in production falls, then supply shifts out. It's the same result, but probably more directly applicable to a situation where a farmer produces both milk and ice cream commercially, rather than selling raw milk to producers of commercial milk and ice cream.)

3. b) WHY? Price will definitely increase if demand shifts out and (or) supply shifts in. The increase in material costs will shift in supply and the increase in incomes will shift out demand. Each of the other choices have demand and supply shifting in the same direction, so that we cannot be certain of the direction of the price change. For a), demand shifts in and supply shifts in, while for c) and d), demand shifts out and supply shifts out. (Why? ski boots and lift tickets are complements, wages and materials are input costs, a technology improvement lowers costs.)

4. b) WHY? The price ceiling creates a shortage. If demand is vertical, there are still 2000 patients, but there are less than 2000 artificial hearts being supplied at the lower price. If demand is not vertical, there is even more of a shortage, since more people would like a heart at the lower price. (You don't need to interpret this as meaning people think, "Wow, what a bargain! I think I'll have a heart transplant." Rather, you might want to imagine that knowing it will be prohibitively expensive to repair or replace a damaged heart makes people take better care of themselves, try alternative treatments, etc. When the price falls, some of these effects are reversed.)

5. b) WHY? Although the price of fruit smoothies went up, the number of people buying smoothies went down (since demand curves slope down). Total revenue (TR) is defined as price (P) times quantity (Q), so TR will move in the direction of whichever change is bigger. It may go up, down or stay the same after a price increase. Since revenue remained unchanged here after the increase in P, it must be the case that \( \frac{\% \Delta Q}{\% \Delta P} = 1 \), meaning demand is unit elastic.

6. b) WHY? This ban on chemicals will make apples more expensive, increasing the demand for a substitute good, strawberries. In a) a complement, milk, is made more expensive, decreasing the demand for strawberries. In c), there is no effect on the demand schedule; it is the supply of strawberries that shifts in.
II. Short Answer Questions

1. Demand shifts out, so P increases, Q increases. (Assume ads change some peoples' tastes)

2. Supply shifts out, so P decreases, Q increases. (Assume milk is an input)

3. Demand shifts out, so P increases, Q increases. (Assume Vermont cheese is a substitute)

4. Supply shifts in, so P increases, Q decreases. (Assume cheese and yogurt are substitutes in production)

5. Demand shifts in, so P decreases, Q decreases. (Assume cheese and crackers are complements)

6. Supply shifts in and Demand shifts out, P increases, and Q depends on size of relative size of shifts. (just adding effects from 1 and 4, same assumptions)

7. Supply shifts in and Demand shifts out, so P depends on relative size of shifts, and Q increases. (just adding effects from 2 and 3, so same assumptions)

III. In-Depth Problem

a) Given the fact that the market is in equilibrium, we know that quantity demanded must equal quantity supplied. The quantity demanded at $10 is 500. Given that there is a fixed number of spaces, the supply curve is vertical at 500, as shown.

b) If the number of parking spaces is reduced by 100, then the supply curve shifts in to reflect that there are 100 fewer spaces supplied at any given price. Now, with a price of $10, the quantity demanded is still 500, but the quantity supplied is 400. There is a shortage. Only those willing to pay the extra cost of getting up early will get a parking space.

c) If Dartmouth sold parking stickers for $12 a month, then only 400 parking spaces would be demanded. At the higher price, some people would decide to walk in, or ride their bike, or take Advanced Transit, or carpool. As a result, everyone who bought a sticker at $12 would get a parking space, no matter what time they arrived on campus. (Assuming, of course, that no one is parked illegally without a sticker!)