Math 150 Section 5.1

Consumer's Surplus: is the total amount saved by consumers who are willing to pay more than market price for a product, yet are able to purchase the product for market price.

$$C.S. = \int_0^{x_e} (D(x) - p_e)dx \quad \text{where } D(x) \text{ is the demand}, \ x \ \text{quantity}, \ p \ \text{price}$$

Producer's Surplus: is the total amount gained by producers who are willing to receive less for a product than market price, yet actually receive market price for the product.

$$P.S. = \int_0^{x_e} (p_e - S(x)) \ dx \quad \text{where } S(x) \text{ is the supply function}$$

Examples:

1) Skinner Bikes, has determined the demand function for a certain brand of mountain bike is given by: $D(x) = -0.3x + 330$, where x is the quantity demanded each month and D(x) is the price per bicycle in dollars. Assuming the market price for the mountain bike is $210 per bicycle, determine the consumer's surplus.

2) Balata Inc. a producer of golf balls, has determined that the supply function for the new Xtra golf ball is given by: $S(x) = 0.24x + 3.70$, where x is the number of dozens supplied each month and S(x) is the price per dozen. If the equilibrium price is $19.30 per dozen, determine the equilibrium demand, then find the producer's surplus at equilibrium.

3) Office House, an office supply store, has determined that the demand for a floppy disk storage case is given by: $D(x) = 30 - x$ and the related supply function is: $S(x) = \sqrt{x}$, where x is the weekly quantity and D(x) & S(x) are in dollars per storage case.
Find the equilibrium point. Determine the Consumer and Producer's surplus at equilibrium.
Sketch the graph of the situation and shade and label the P.S. and C.S. on the graph.

Answers: 1) consumer's surplus is $24,000 each month 2) demand of 65 dozen golf balls, gives P.S. of $507 3) equilibrium point (25,5)   C.S. = $312.50 and P.S. is about $41.67