

Consumer Surplus and Market Demand

I. Warm-up

$$q = 20 - p$$

- a. Describe in words what the q-intercept (20) means

maximum possible quantity sold

when $p=0$, $q=20$

- b. Write the formula in inverse demand form

$$q = 20 - p$$

$$q + p = 20$$

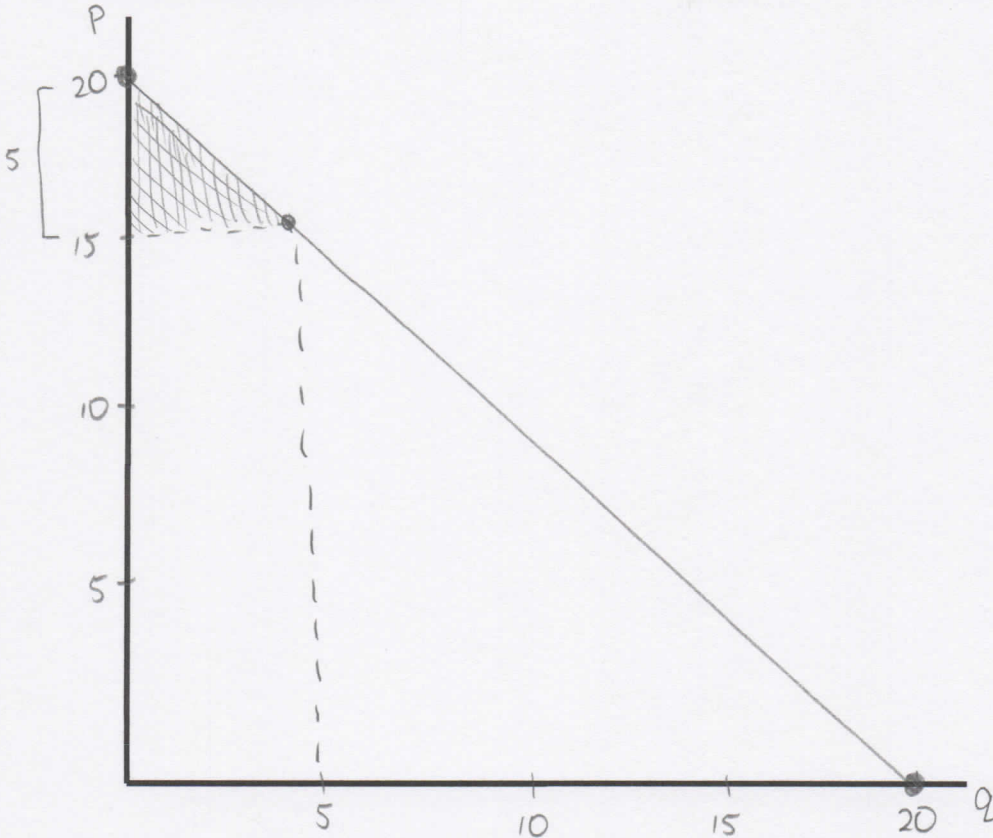
$$p = 20 - q$$

- c. Describe in words what the p-intercept means

consumer will only buy if price is less than \$20

when $p = \$20$, $q = 0$

- d. Graph the demand curve



II. Consumer Surplus

- a. Using the same demand curve as above, find the consumer surplus when price is \$15

$$q = 20 - p$$

$$q = 20 - 15$$

$$q = 5$$

$$CS = \frac{1}{2} (5)(5) = \$12.50$$

- b. In general: Consumer surplus is everything above their price, below the demand curve, and to the left of quantity.

III. Market Demand

Assume another consumer enters the market with the demand function $q = 10 - p$.

Consumer A: $q = 20 - p$

Consumer B: $q = 10 - p$

- a. Price = \$5. Does consumer A buy? Does consumer B buy? What is the total number of units consumers A and B would buy?

<p>Consumer A: yes; $q = 20 - p = 20 - 5 = 15$</p>	<p>Consumer B: yes; $q = 10 - p = 10 - 5 = 5$</p>	<p>$Q = q_A + q_B$ $Q = 15 + 5$ $Q = 20$</p>
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- b. Price = \$10. Does consumer A buy? Does consumer B buy? What is the total number of units consumers A and B would buy?

<p>Consumer A: yes; $q = 20 - p = 20 - 10 = 10$</p>	<p>Consumer B: no; $q = 10 - p = 10 - 10 = 0$</p>	<p>$Q = q_A + q_B$ $Q = 10 + 0$ $Q = 10$</p>
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- c. Price = \$15. Does consumer A buy? Does consumer B buy? What is the total number of units consumers A and B would buy?

<p>Consumer A: yes; $q = 20 - p = 20 - 15 = 5$</p>	<p>Consumer B: no; $q = 10 - p = 10 - 15 = -5 \rightarrow 0$</p>	<p>$Q = q_A + q_B$ $Q = 5 + 0$ $Q = 5$</p>
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- d. In general, consumer A will buy when $p < 20$ and consumer B will buy when $p < 10$. Thus, both consumers will buy when $0 \leq p < 10$ and only consumer A will buy when $10 \leq p < 20$. No one will buy if $p \geq 20$.

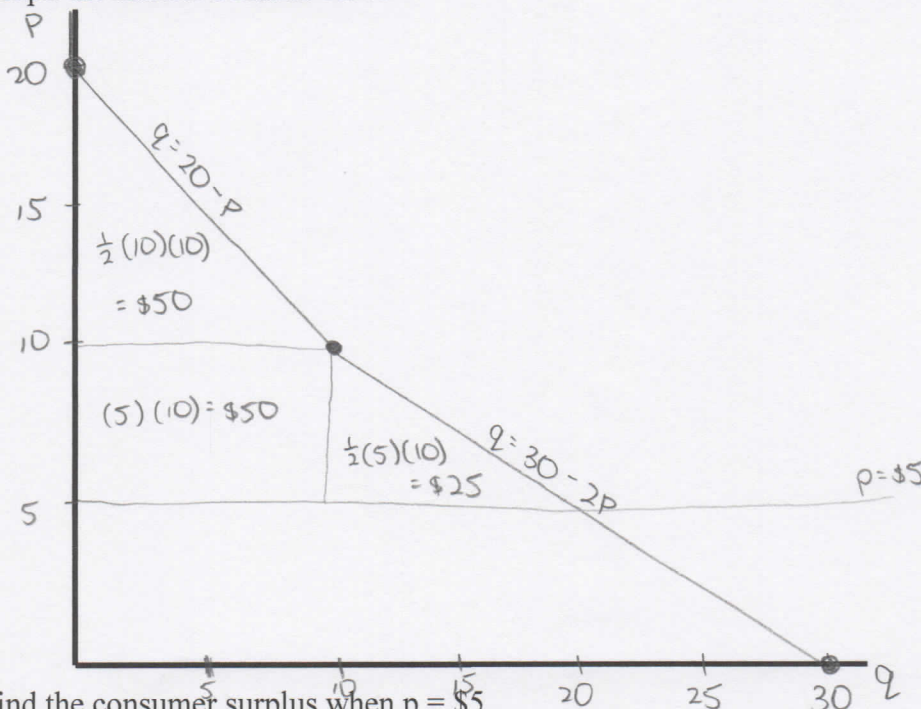
- e. The equation for market demand is:

If $p \geq 20$ then $q = 0$

If $10 \leq p < 20$ then $q = 20 - p$

If $0 \leq p < 10$ then $q = (20 - p) + (10 - p) = 30 - 2p$

- f. Graph the market demand curve



P-int.
 $p = \$20$ (0, 20)

Q-int.
 $q = 30$ (30, 0)

KINK POINT
(10, 10)

- g. Find the consumer surplus when $p = \$5$

$CS = \$50 + \$50 + \$25 = \125

* $p = \$10$
 $q = 20 - 10 = 10$
 $q = 30 - (2 \times 10) = 10$
 $= 10 \checkmark$

* where they switch from
 $q = 20 - p$ to $q = 30 - 2p$