## Algebra of Supply and Demand: Practice problems

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# 1. Finding equilibrium price and quantity

Suppose a market can be represented by the following equations: Demand:  $P = 100 - 5Q_D$ Supply:  $P = 51 + 2Q_S$ 

Identify the y-intercept \_\_\_\_\_ and slope\_\_\_\_\_ of the demand function.

Identify the y-intercept \_\_\_\_\_ and slope \_\_\_\_\_ of the supply function.

**Solve** for the market equilibrium quantity (Q<sup>\*</sup>) and market equilibrium price (P<sup>\*</sup>):

## Fill in the blanks for the graph at right:

(A = demand curve y-intercept. B =  $P^*$ , C = supply curve y-intercept, D =  $Q^*$ , E = Demand curve x-intercept -- found by setting P =0 in the demand function).

## 2. Shift in demand

Our supply function remains the same:  $P = 51 + 2Q_s$ Our new demand function is  $P = 86 - 5Q_D$ 

Identify the y-intercept \_\_\_\_\_\_ and slope\_\_\_\_\_\_ of the demand function.

Has demand increased or decreased? How can you tell?

Solve for the new market equilibrium P<sup>\*</sup> and Q<sup>\*</sup>:

*Sketch the change in demand on the graph at right.* Use correct numbers to label the y-intercepts and old and new prices and quantities.

## 3. Shift in supply

Our demand function is the original  $P = 100 - 5Q_D$ Our new supply function is  $P = 28 + 3Q_S$ 

Identify the y-intercept \_\_\_\_\_ and slope \_\_\_\_\_ of the supply function.

Has supply increased or decreased? How can you tell?

Solve for the new market equilibrium P<sup>\*</sup> and Q<sup>\*</sup>:







Sketch the change in supply on the graph at right:

#### ANSWERS!!

#### 1. Finding equilibrium price and quantity

Demand:  $P = 100 - 5Q_D$ Supply:  $P = 51 + 2Q_S$ 

Demand function Y-intercept= **100** and slope = **-5** Supply function y-intercept = 51 and slope = 2.

Market equilibrium quantity (Q<sup>\*</sup>) and market equilibrium price (P<sup>\*</sup>): 100 - 5Q = 51 + 2Q 49 = 7Q **Q = 7 P** = 100 - 5(7) = 65







#### 51 + 2Q = 86 - 5Q 7Q = 35

**2.** Shift in demand Supply: P = 51 + 2Qs

New demand  $P = 86 - 5Q_D$ 

Demand function y-intercept = 86 and slope = -5

Solve for the new market equilibrium P<sup>\*</sup> and Q<sup>\*</sup>:

Demand has **decreased** because the y-intercept is lower.

Q = 5 P = 51 + 2(5) = 61

#### 3. Shift in supply

Demand is the original  $P = 100 - 5Q_D$ New supply function is  $P = 28 + 3Q_S$ 

Supply y-intercept= 28 and slope = 3 (notice that the slope got steeper).

Supply has **increased** – the lower y-intercept indicates a rightward shift of the quantity supplied at any price.

100 - 5Q = 28 + 3Q72 = 8 Q Q = 9 P = 100 - 5(9) = 55

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