



AAU - Business Mathematics I
Problem set #1, Due March 13, 2010

1. Find intersection and union of the following sets:

- (a) $A = (-\infty, 5)$; $B = (2, 8)$
- (b) $A = [1, 7]$; $B = (7, 11)$
- (c) $A = (-\infty, 2)$; $B = [0, 4]$; $C = (1, 102]$

2. Simplify (factorize) the following algebraic expressions:

- (a) $\frac{7x - 1}{2x^2 + 6x} + \frac{5 - 3x}{x^2 - 9}$
- (b) $a^3 - 2a^2 - 4a + 8$
- (c) $\frac{1}{1 - x} + \frac{1}{x}$
- (d) $\frac{3x - 1}{2x + 2} - \frac{2x + 2}{2x + 1}$

3. Use substitution method to solve the following system of equations:

$$\begin{aligned}x + 3y &= 3 \\ -x + 3y &= 1\end{aligned}$$

4. Use elimination method to solve the following system of equations:

$$\begin{aligned}2x + 3y &= 13 \\ 2x - y &= 1\end{aligned}$$

5. The demand for apples is $Q = 80 - P$ and the supply is $Q = 2P + 50$, where P is the price measured in dollars and Q is the quantity.

- (a) On one graph, draw the demand curve and the supply curve for apples.
- (b) What is the equilibrium price of apples? What is the equilibrium quantity? Show the equilibrium price and quantity on the graph and label them P_1 and Q_1 .
- (c) Due to the bad weather conditions there are less apples on trees than usual. The supply schedule shifts to $Q = 2P + 20$. The demand schedule remains as before. Draw the new supply schedule.
- (d) What is the new equilibrium price of apples? What is the new equilibrium quantity? Show the equilibrium price and quantity on the graph and label them P_2 and Q_2 .