# Solution Math 131 Quiz 2 (A)

**Q.1:** The demand function for a manufacturer's product is $p = f(q) = 600 - 2q$, where $p$ is the price (in dollars) per unit when $q$ units are demanded (per week). Find the level of production that maximizes the manufacturer's total revenue and determine this revenue.

Sol: $R = pq = (600 - 2q)\,q = -2q^2 + 600q$. The revenue is maximum at $q = -\dfrac{600}{2(-2)} = 150$ and maximum revenue is $R(150) = -2(150)^2 + 600(150) = \$45000$.

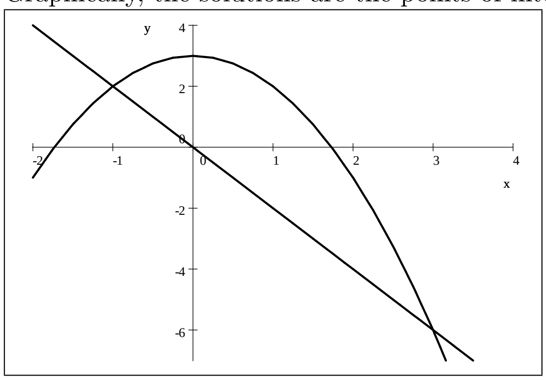
**Q.2:** The supply and demand equations for a product are $p = q + 20$ and $p = 200 - q$, respectively, where $q$ represents the number of units and $p$ represents the price per unit in dollars. Find the equilibrium price.

Sol: $q + 20 = 200 - q$ gives $2q = 180$ or $q = 90$.

**Q.3** Solve the system 
$$\begin{aligned} x^2 + y - 3 &= 0 \\ 2x + y &= 0 \end{aligned}$$

Sol: From second equation $y = -2x$. Put in the first equation, $x^2 - 2x - 3 = 0$ gives $x = -1$ and $x = 3$. For $x = -1,\ y = 2$ and for $x = 3,\ y = -6$. So the solutions are $(-1, 2)$ and $(3, -6)$.

Graphically, the solutions are the points of intersection of the graphs:




**Q.4:** A coffee wholesaler blends together three types of coffee that sell for \$1.95, \$2.10, and \$2.25 per pound so as to obtain 100 pounds of coffee worth \$2.13 per pound. If the wholesaler uses the same amount of the two higher-priced coffees, how much of each type must be used in the blend?

Sol: Let $x$ = number of pounds of cofee that sells for \$1.95 per pound.
$y$ = number of pounds of cofee that sells for \$2.10 per pound.
$z$ = number of pounds of cofee that sells for \$2.25 per pound.

then $1.95x + 2.10y + 2.25z = 2.13(100)$
$x + y + z = 100$
$y = z$

Solving these equations, we get $x = 20,\ y = 40,\ z = 40$.

**Q.5:** Sketch the region described by the following system of inequalities: 
$$\begin{aligned} x &> 0 \\ y &\geq 2x - 6 \\ 2y + x &< 8 \end{aligned}.$$