Week 3: Equations and Inequalities

Solutions

1. Solve these equations:

   (a) $3x + 4 = 4x + 3$

   (b) $5m - 3 = 5(m - 3) + 2m$

   (c) $\frac{5}{m} = \frac{2}{m+1}$

   (d) $\frac{4x+5}{6} - \frac{2x-1}{3} = x$

   Solution:

   (a) $x = 1$

   (b) $m = 6$

   (c) $m = -\frac{5}{3} = -1\frac{2}{3} = -1.667$

   (d) $x = 7/6 = 11/6 = 1.167$

2. If $a = 2$, find b if $54 = a - 4b$

   Solution: $b = -13$

3. Solve

   (a) $x^2 = 9$

   Solution: $x = +3, -3$

   (b) $x^2 - 2x - 8 = 0$

   Solution: $x = 4, -2$

   (c) $3x^2 + 7x - 6 = 0$

   Solution: $x = 2/3, -3$

   (d) $6x^2 = x + 2$

   Solution: $x = 2/3, -1/2$

   (e) $4a^2 - 25 = 0$

   Solution: $a = 2.5, -2.5$

   (f) $12y^2 - 10 = 26y$

   Solution: $y = 5/2, -1/3$

   (g) $6a^2 - 15a = 0$

   Solution: $a = 0, 5/2$

   (h) $3b^2 + 5b = 3$

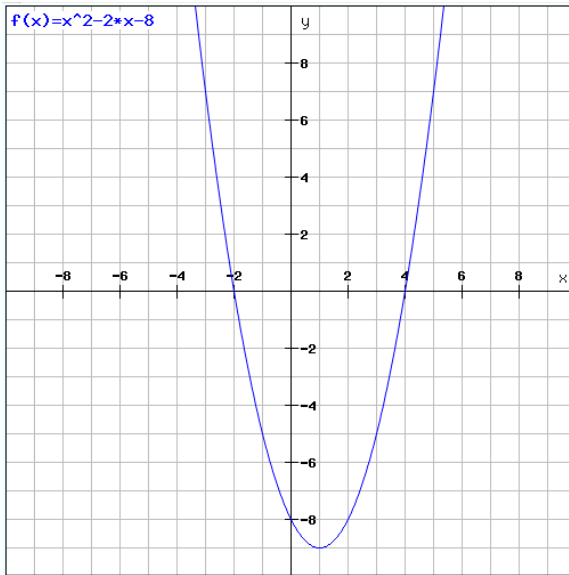   **Solution:** $b = 0.4684, -2.135$

   (i) $-4x^2 + 2x + 1 = 0$

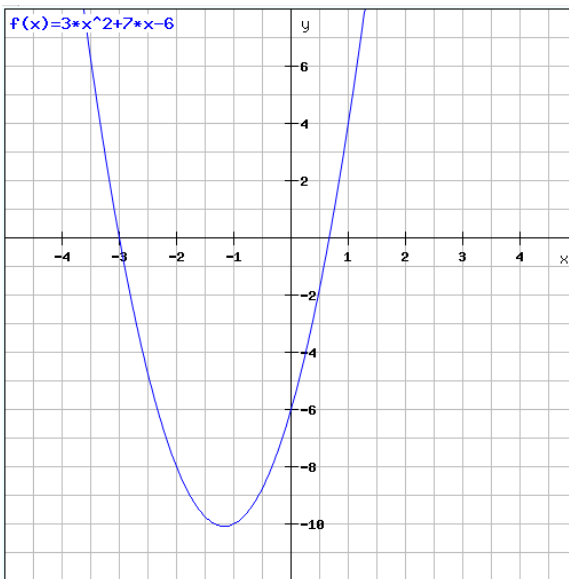   **Solution:** $x = -0.3090, 0.8090$
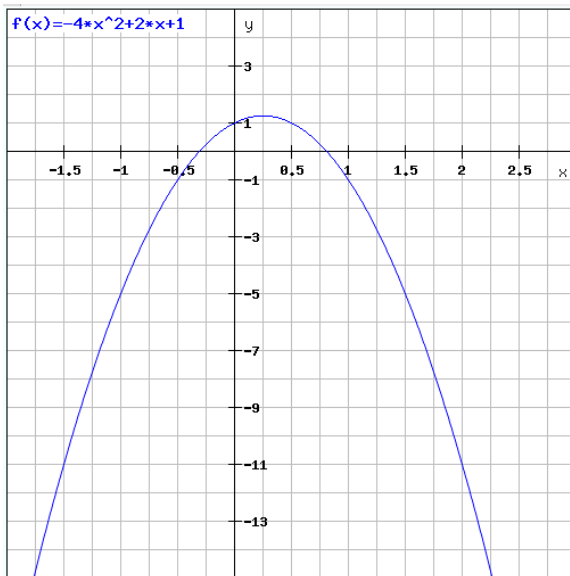
4. Sketch the curves

   Solution:

   (a) $y = x^2 - 2x - 8$

   (b) $y = 3x^2 + 7x - 6$

(c) $y = -4x^2 + 2x + 1$

5. Solve the simultaneous equations:

$$3x + 5y = 31 \quad (1)$$

$$\text{and} \quad 2x + 3y = 20 \quad (2)$$

Solution: $x = 7, y = 2$

6. Solve the simultaneous equations: $y = 2x + 3$ and $5x + 2y = -9$

Solution: $x = -1\frac{2}{3}, y = -\frac{1}{3}$