1. Factor the following quadratic equations to solve them.

(a) $x^2 - 14x + 48 = 0$ (b) $x^2 + 8x + 16 = 0$ (c) $x^2 - x - 12 = 0$

(d) $x^2 + 6x - 7 = 0$ (e) $x^2 + 5x + 4 = 0$ (f) $x^2 - 3x - 18 = 0$

(g) $x^2 - 6x - 16 = 0$ (h) $x^2 - 8x + 15 = 0$ (i) $x^2 + 8x + 7 = 0$

(j) $x^2 - 5x + 6 = 0$ (k) $x^2 - 9x + 18 = 0$ (l) $x^2 + 10x + 16 = 0$

(m) $2x^2 - 2x - 4 = 0$ (n) $2x^2 + 7x = 0$ (o) $5x^2 - 12x = -7$

(p) $4x^2 + 24x - 28 = 0$ (q) $2x^2 - 4x = 0$ (r) $2x^2 + 20x = -42$

2. Calculate the discriminant and determine if each quadratic equation has zero, one or two solutions.

(a) $-3x^2 - 2x - 5$ (b) $6x^2 + 7x - 6$ (c) $-5x^2 - 4x + 19$ (d) $-9x^2 + 8x - 12$

(e) $-17x^2 - 10x - 8$ (f) $-9x^2 - 7x$ (g) $-8x^2 + 8x - 2$ (h) $13x^2 - 3x - 18$

3. Solve the following.

(a) $-2x^2 - 6x + 2 = 8$ (b) $x^2 - 7x - 18 = 0$ (c) $x^2 - 3 = 0$ (d) $-6x^2 - 3x - 8 = -6$

(e) $-4x^2 + 9x + 9 = 5$ (f) $7x^2 - 31x - 20 = 0$ (g) $3x^2 + x + 4 = -7$ (h) $4x^2 - 2x + 4 = -7$

(i) $9x^2 + 4x - 7 = -3$ (j) $-8x^2 + 2x + 1 = 3$ (k) $-2x^2 - 4x - 7 = 1$ (l) $3x^3 - 5x^2 + 2x = 0$

(m) $9x^2 + 3x - 6 = 1$ (n) $x^2 - 5x - 14 = 0$ (o) $-8x^2 + 4x - 9 = 1$ (p) $18x^3 - 8x = 0$

(q) $7x^2 + 9x + 2 = 1$ (r) $3x^2 + 8x + 3 = -4$ (s) $-x^2 - 4x + 6 = -6$ (t) $x^2 + 14x = 5$

(u) $9x^2 - 8x - 6 = -8$ (v) $-3x^2 = 6$ (w) $36x^2 - 25 = 0$ (x) $2x^2 - 6x + 5 = -7$

Answers

1. (a) $x = 6, x = 8$ (b) $x = -4$ (c) $x = -3, x = 4$ (d) $x = 1, x = -7$

   (e) $x = -4, x = -1$ (f) $x = 6, x = -3$ (g) $x = -2, x = 8$ (h) $x = 3, x = 5$

   (i) $x = -7, x = -1$ (j) $x = 3, x = 2$ (k) $x = 6, x = 3$ (l) $x = -8, x = -2$

   (m) $x = 2, x = -1$ (n) $x = -\frac{7}{2}, x = 0$ (o) $x = 1, x = \frac{7}{5}$ (p) $x = 1, x = -7$

   (q) $x = 0, x = 2$ (r) $x = -3, x = -7$

2. (a) -56, no solutions. (b) 193, two solutions. (c) 396, two solutions. (d) -368, no solutions.

   (e) -444, no solutions. (f) 49, two solutions. (g) 0, one solution. (h) 945, two solutions.

3. (a) No solution.

   (b) $x = -2, x = 9$

   (c) $x = \pm\sqrt{3}$

   (d) No solution.

   (e) $x = -\frac{1}{8}\sqrt{145} + \frac{9}{8}, x = \frac{1}{8}\sqrt{145} + \frac{9}{8}$

   (f) $x = -\frac{4}{7}, x = 5$

   (g) No solution.

   (h) No solution.

   (i) $x = -\frac{2}{9}\sqrt{10} - \frac{2}{9}, x = \frac{2}{9}\sqrt{10} - \frac{2}{9}$

   (j) No solution.

   (k) No solution.

   (l) $x = 0, x = \frac{2}{3}, x = 1$

   (m) $x = -\frac{1}{6}\sqrt{29} - \frac{1}{6}, x = \frac{1}{6}\sqrt{29} - \frac{1}{6}$

   (n) $x = -2, x = 7$

   (o) No solution.

   (p) $x = 0, x = \pm\frac{2}{3}$

   (q) $x = -\frac{1}{14}\sqrt{53} - \frac{9}{14}, x = \frac{1}{14}\sqrt{53} - \frac{9}{14}$

   (r) No solution.

   (s) $x = -6, x = 2$

   (t) $x = -7 - 3\sqrt{6}, x = -7 + 3\sqrt{6}$

   (u) No solution.

   (v) No solution.

   (w) $x = \pm\frac{5}{6}$

   (x) No solution.