

**Gateway Exam #1 Practice Problems  
The Quadratic Formula**

1. The roots of the polynomial  $x^2 - x - 1$  are:

(a)  $x = \frac{1 + \sqrt{5}}{2}$  and  $x = \frac{1 - \sqrt{5}}{2}$

(b)  $x = 1 + \sqrt{5}$  and  $x = 1 - \sqrt{5}$

(c)  $x = \frac{1 + \sqrt{5}}{2}$  only

(d)  $x = \frac{-1 + \sqrt{5}}{2}$  and  $x = \frac{-1 - \sqrt{5}}{2}$

(e) The given polynomial has no real roots.

2. The roots of the polynomial  $-x^2 + 4x + 1$  are:

(a)  $x = -2 + \sqrt{5}$  and  $x = -2 - \sqrt{5}$

(b)  $x = -4 + 2\sqrt{5}$  and  $x = -4 - 2\sqrt{5}$

(c)  $x = 4 + 2\sqrt{5}$  and  $x = 4 - \sqrt{5}$

(d)  $x = 2 + \sqrt{5}$  and  $x = 2 - \sqrt{5}$

(e) The given polynomial has no real roots.

3. The roots of the polynomial  $x^3 + 2x^2 + 2x$  are:

(a)  $x = 0$  and  $x = -2$

(b)  $x = 0$  and  $x = -1 + \sqrt{3}$  and  $x = -1 - \sqrt{3}$

(c)  $x = -1 + \sqrt{3}$  and  $x = -1 - \sqrt{3}$

(d)  $x = 0$  only

(e) The given polynomial has no real roots.

4. The roots of the polynomial  $x^2 + 4x + 9$  are:

(a)  $x = -2 + \sqrt{13}$  and  $x = -2 - \sqrt{13}$

(b)  $x = -2 + \sqrt{13}$  only

(c)  $x = -2 + \sqrt{5}$  and  $x = -2 - \sqrt{5}$

(d)  $x = \frac{-2 + \sqrt{5}}{2}$  and  $x = \frac{-2 - \sqrt{5}}{2}$

(e) The given polynomial has no real roots.

5. The roots of the polynomial  $4x^2 + 4x - 3$  are:

(a)  $x = 2$  and  $x = -12$

(b)  $x = \frac{1}{2}$  and  $x = -\frac{3}{2}$

- (c)  $x = \frac{1}{2}$  only
- (d)  $x = \frac{3}{2}$  and  $x = -\frac{1}{2}$
- (e) The given polynomial has no real roots.

6. The roots of the polynomial  $3x^2 + x + 2$  are:

- (a)  $x = -1$  and  $x = \frac{2}{3}$
- (b)  $x = \frac{-1 + \sqrt{23}}{6}$  and  $x = \frac{-1 - \sqrt{23}}{6}$
- (c)  $x = \frac{-1 + \sqrt{23}}{2}$  and  $x = \frac{-1 - \sqrt{23}}{2}$
- (d)  $x = \frac{-1 + \sqrt{23}}{6}$  only
- (e) The given polynomial has no real roots.

7. The roots of the polynomial  $2x^2 + x - 7$  are:

- (a)  $x = \frac{-1 + \sqrt{57}}{2}$  and  $x = \frac{-1 - \sqrt{57}}{2}$
- (b)  $x = \frac{1 + \sqrt{57}}{4}$  and  $x = \frac{1 - \sqrt{57}}{4}$
- (c)  $x = \frac{-1 + \sqrt{57}}{4}$  and  $x = \frac{-1 - \sqrt{57}}{4}$
- (d)  $x = \frac{1 + \sqrt{57}}{2}$  only
- (e) The given polynomial has no real roots.

8. The roots of the polynomial  $2x^2 + 2x - 1$  are:

- (a)  $x = \frac{-1 + \sqrt{3}}{2}$  and  $x = \frac{-1 - \sqrt{3}}{2}$
- (b)  $x = \frac{1 + \sqrt{3}}{2}$  and  $x = \frac{1 - \sqrt{3}}{2}$
- (c)  $x = -1 + \sqrt{3}$  and  $x = -1 - \sqrt{3}$
- (d)  $x = \frac{1 + \sqrt{3}}{2}$  only
- (e) The given polynomial has no real roots.

9. The roots of the polynomial  $3x^2 - 11$  are:

- (a)  $x = \frac{2\sqrt{33}}{3}$  and  $x = -\frac{2\sqrt{33}}{3}$
- (b)  $x = \frac{\sqrt{33}}{3}$  and  $x = -\frac{\sqrt{33}}{3}$
- (c)  $x = 0$  and  $x = \frac{11}{3}$

(d)  $x = \sqrt{\frac{11}{3}}$  only

(e) The given polynomial has no real roots.

10. The roots of the polynomial  $-x^2 - 2x - 3$  are:

(a)  $x = -1 + \sqrt{2}$  and  $x = -1 - \sqrt{2}$

(b)  $x = -1 + \sqrt{2}$  only

(c)  $x = -1 - \sqrt{2}$  only

(d)  $x = -3$  and  $x = 1$

(e) The given polynomial has no real roots.

**Answers:**

1. a

2. d

3. d

4. e

5. b

6. e

7. c

8. a

9. b

10. e