

Analyzing and Solving Polynomial Equations

Find the parameters given in each equation

1 $x^3 - 1 = 0$

- a) Number of complex roots: _____
- b) Possible number of real roots: _____
- c) Possible number of imaginary roots: _____
- d) Possible number of positive real roots: _____
- e) Possible negative real roots: _____
- f) Possible rational roots: _____

2 $x^3 - 2x^2 - 3x + 6 = 0$

- a) Number of complex roots: _____
- b) Possible number of real roots: _____
- c) Possible number of imaginary roots: _____
- d) Possible number of positive real roots: _____
- e) Possible negative real roots: _____
- f) Possible rational roots: _____

3 $x^6 - 2x^4 - 4x^2 + 8 = 0$

- a) Number of complex roots: _____
- b) Possible number of real roots: _____
- c) Possible number of imaginary roots: _____
- d) Possible number of positive real roots: _____
- e) Possible negative real roots: _____
- f) Possible rational roots: _____

4 $x^4 + 3x^2 - 18 = 0$

- a) Number of complex roots: _____
- b) Possible number of real roots: _____
- c) Possible number of imaginary roots: _____
- d) Possible number of positive real roots: _____
- e) Possible negative real roots: _____
- f) Possible rational roots: _____

Analyzing and Solving Polynomial Equations

Find the parameters given in each equation

1 $x^3 - 1 = 0$

a) Number of complex

roots: 3

b) Possible number of real

roots: 3 or 1

c) Possible number of imaginary

roots: 2 or 0

d) Possible number of positive

real roots: 1

e) Possible negative

real roots: ± 1

f) Possible rational

roots: $\{1, \frac{-1+i\sqrt{3}}{2}, \frac{-1-i\sqrt{3}}{2}\}$

2 $x^3 - 2x^2 - 3x + 6 = 0$

a) Number of complex

roots: 3

b) Possible number of real

roots: 3 or 1

c) Possible number of imaginary

roots: 2 or 0

d) Possible number of positive

real roots: 1

e) Possible negative

real roots: $\pm 1, \pm 2, \pm 3, \pm 6$

f) Possible rational

roots: $\{2, \sqrt{3}, -\sqrt{3}\}$

3 $x^6 - 2x^4 - 4x^2 + 8 = 0$

a) Number of complex

roots: 6

b) Possible number of real

roots: 6, 4, 2 or 0

c) Possible number of imaginary

roots: 6, 4, 2 or 0

d) Possible number of positive

real roots: 2 or 0

e) Possible negative

real roots: $\pm 1, \pm 2, \pm 4, \pm 8$

f) Possible rational

roots: $\{\sqrt{2}$ multiplicity of 2,
 $-\sqrt{2}$ multiplicity of 2, $i\sqrt{2}, -i\sqrt{2}\}$

4 $x^4 + 3x^2 - 18 = 0$

a) Number of complex

roots: 4

b) Possible number of real

roots: 4, 2 or 0

c) Possible number of imaginary

roots: 4, 2 or 0

d) Possible number of positive

real roots: 1

e) Possible negative

real roots: $\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18,$

f) Possible rational

roots: $\{\sqrt{3}, -\sqrt{3}, i\sqrt{6}, -i\sqrt{6}\}$