

Assignment: Roots of Polynomial

Date _____

Find all roots.

1) $x^3 - 8x^2 + 25x = 0$

2) $x^2 + 6x - 21 = 0$

3) $x^2 - 6x + 13 = 0$

4) $x^2 + 4x + 8 = 0$

State the number of complex zeros and the possible number of imaginary zeros for each function. Then find all zeros.

5) $f(x) = 3x^2 - 4x + 1$

6) $f(x) = 5x^2 - 14x + 8$

7) $f(x) = x^2 + 12x - 2$

8) $f(x) = 5x^3 - 19x^2 - 9x - 1$

State the number of complex roots, the possible number of real and imaginary roots, the possible rational roots, and an interval in which all real roots lie for each equation. Then find all roots.

9) $x^3 - 125 = 0$

10) $x^3 - x^2 - 3x + 3 = 0$

Answers to Assignment: Roots of Polynomial

1) $\{0, 4 + 3i, 4 - 3i\}$

4) $\{-2 + 2i, -2 - 2i\}$

2) $\{-3 + \sqrt{30}, -3 - \sqrt{30}\}$

5) # of complex zeros: 2

Possible # of imaginary zeros: 2 or 0

Zeros: $\left\{\frac{1}{3}, 1\right\}$

6) # of complex zeros: 2

Possible # of imaginary zeros: 2 or 0

Zeros: $\left\{\frac{4}{5}, 2\right\}$

8) # of complex zeros: 3

Possible # of imaginary zeros: 2 or 0

Zeros: $\left\{-\frac{1}{5}, 2 + \sqrt{5}, 2 - \sqrt{5}\right\}$

3) $\{3 + 2i, 3 - 2i\}$

7) # of complex zeros: 2

Possible # of imaginary zeros: 2 or 0

Zeros: $\{-6 + \sqrt{38}, -6 - \sqrt{38}\}$

9) # of complex roots: 3

Possible # of real roots: 3 or 1

Possible # of imaginary roots: 2 or 0

Possible rational roots: $\pm 1, \pm 5, \pm 25, \pm 125$

Real roots lie in: $[0, 5]$

Roots: $\left\{5, \frac{-5 + 5i\sqrt{3}}{2}, \frac{-5 - 5i\sqrt{3}}{2}\right\}$

10) # of complex roots: 3

Possible # of real roots: 3 or 1

Possible # of imaginary roots: 2 or 0

Possible rational roots: $\pm 1, \pm 3$

Real roots lie in: $[-2, 3]$

Roots: $\{1, \sqrt{3}, -\sqrt{3}\}$