

Assignment: Polynomial with complex and real roots

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

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

2) $f(x) = 2x^3 - 3x^2 + x$

3) $f(x) = x^3 - 64$

4) $f(x) = 2x^3 - x^2 - 14x - 8$

State the possible rational zeros for each function. Then find all zeros.

5) $f(x) = 5x^4 + 7x^2 - 6$

6) $f(x) = 2x^4 - 3x^2 - 2$

7) $f(x) = 5x^4 - 18x^2 - 8$

8) $f(x) = 2x^4 - x^2 - 1$

Answers to Assignment: Polynomial with complex and real roots

1) # of complex zeros: 3

$$\text{Zeros: } \left\{ -1, 1, \frac{1}{5} \right\}$$

2) # of complex zeros: 3

$$\text{Zeros: } \left\{ 0, \frac{1}{2}, 1 \right\}$$

3) # of complex zeros: 3

$$\text{Zeros: } \left\{ 4, -2 + 2i\sqrt{3}, -2 - 2i\sqrt{3} \right\}$$

4) # of complex zeros: 3

$$\text{Zeros: } \left\{ -2, \frac{5 + \sqrt{57}}{4}, \frac{5 - \sqrt{57}}{4} \right\}$$

5) Possible rational zeros:

$$\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{5}, \pm \frac{2}{5}, \pm \frac{3}{5}, \pm \frac{6}{5}$$

$$\text{Zeros: } \left\{ i\sqrt{2}, -i\sqrt{2}, \frac{\sqrt{15}}{5}, -\frac{\sqrt{15}}{5} \right\}$$

6) Possible rational zeros: $\pm 1, \pm 2, \pm \frac{1}{2}$

$$\text{Zeros: } \left\{ \sqrt{2}, -\sqrt{2}, \frac{i\sqrt{2}}{2}, -\frac{i\sqrt{2}}{2} \right\}$$

7) Possible rational zeros:

$$\pm 1, \pm 2, \pm 4, \pm 8, \pm \frac{1}{5}, \pm \frac{2}{5}, \pm \frac{4}{5}, \pm \frac{8}{5}$$

$$\text{Zeros: } \left\{ \frac{i\sqrt{10}}{5}, -\frac{i\sqrt{10}}{5}, 2, -2 \right\}$$

8) Possible rational zeros: $\pm 1, \pm \frac{1}{2}$

$$\text{Zeros: } \left\{ \frac{i\sqrt{2}}{2}, -\frac{i\sqrt{2}}{2}, 1, -1 \right\}$$

