

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

1) $f(x) = 5x^5 + 11x^4 + 7x^3 + x^2$

2) $f(x) = 3x^5 + 5x^4 + 15x^3 + 25x^2$

3) $f(x) = 3x^5 + 26x^4 + x^3 - 10x^2$

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

5) $f(x) = 3x^5 - 7x^4 + 5x^3 - x^2$

6) $f(x) = 5x^5 - 51x^4 + 30x^3 - 4x^2$

7) $f(x) = 5x^5 - 19x^4 - 29x^3 - 5x^2$

8) $f(x) = 4x^5 - 22x^4 - 8x^3 + 9x^2$

Answers to

1) Possible rational zeros: $0, \pm 1, \pm \frac{1}{5}$

Rational zeros: $\left\{0 \text{ mult. } 2, -\frac{1}{5}, -1 \text{ mult. } 2\right\}$

3) Possible rational zeros:

$$0, \pm 1, \pm 2, \pm 5, \pm 10, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{5}{3}, \pm \frac{10}{3}$$

Rational zeros: $\left\{0 \text{ mult. } 2, -\frac{2}{3}\right\}$

5) Possible rational zeros: $0, \pm 1, \pm \frac{1}{3}$

Rational zeros: $\left\{0 \text{ mult. } 2, \frac{1}{3}, 1 \text{ mult. } 2\right\}$

7) Possible rational zeros: $0, \pm 1, \pm 5, \pm \frac{1}{5}$

Rational zeros: $\left\{0 \text{ mult. } 2, -\frac{1}{5}, -1, 5\right\}$

2) Possible rational zeros:

$$0, \pm 1, \pm 5, \pm 25, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{25}{3}$$

Rational zeros: $\left\{0 \text{ mult. } 2, -\frac{5}{3}\right\}$

4) Possible rational zeros: $0, \pm 1, \pm \frac{1}{5}$

Rational zeros: $\left\{0 \text{ mult. } 2, \frac{1}{5}, 1, -1\right\}$

6) Possible rational zeros:

$$0, \pm 1, \pm 2, \pm 4, \pm \frac{1}{5}, \pm \frac{2}{5}, \pm \frac{4}{5}$$

Rational zeros: $\left\{0 \text{ mult. } 2, \frac{1}{5}\right\}$

8) Possible rational zeros:

$$0, \pm 1, \pm 3, \pm 9, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{9}{2}, \pm \frac{1}{4}, \pm \frac{3}{4}, \pm \frac{9}{4}$$

Rational zeros: $\left\{0 \text{ mult. } 2, \frac{1}{2}\right\}$