

Factors and Zeros

Date _____ Period _____

Find all zeros.

1) $f(x) = (2x - 1)(x - 5)$

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

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

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

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

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

7) $f(x) = x(2x - 1)(x - 1)(x + 1)$

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

Write a polynomial function of least degree with integral coefficients that has the given zeros.

9) 3, 2, -2

10) 3, 1, -2, -4

11) 5, -1, 0

12) $-3, -\frac{1}{3}, 5$

13) $\frac{5}{3}, 1, -1$

14) $2, \frac{5}{3}, -5$

Find all zeros by factoring each function.

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

16) $f(x) = x^3 + 8$

17) $f(x) = x^4 - x^2 - 30$

18) $f(x) = x^4 + x^2 - 12$

19) $f(x) = x^6 - 64$

20) $f(x) = x^6 + 2x^3 + 1$

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Date _____ Period _____

Find all zeros.

1) $f(x) = (2x - 1)(x - 5)$

$\left\{\frac{1}{2}, 5\right\}$

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

$\left\{3, -\frac{1}{3}, -1\right\}$

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

$\left\{-\frac{1}{2}, -1, 1\right\}$

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

$\left\{0, \frac{2}{5}, i, -i\right\}$

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

$\left\{0, -2, 2, \frac{2\sqrt{3}}{3}, -\frac{2\sqrt{3}}{3}\right\}$

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

$\left\{\frac{1}{2}, i\sqrt{3}, -i\sqrt{3}, \frac{\sqrt{10}}{2}, -\frac{\sqrt{10}}{2}\right\}$

7) $f(x) = x(2x - 1)(x - 1)(x + 1)$

$\left\{0, \frac{1}{2}, 1, -1\right\}$

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

$\left\{-\frac{5}{2}, 1 + \sqrt{6}, 1 - \sqrt{6}\right\}$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

9) 3, 2, -2

$f(x) = x^3 - 3x^2 - 4x + 12$

10) 3, 1, -2, -4

$f(x) = x^4 + 2x^3 - 13x^2 - 14x + 24$

11) 5, -1, 0

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

12) $-3, -\frac{1}{3}, 5$

$$f(x) = 3x^3 - 5x^2 - 47x - 15$$

13) $\frac{5}{3}, 1, -1$

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

14) $2, \frac{5}{3}, -5$

$$f(x) = 3x^3 + 4x^2 - 45x + 50$$

Find all zeros by factoring each function.

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

$$\{0, 1 \text{ mult. } 2\}$$

16) $f(x) = x^3 + 8$

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

17) $f(x) = x^4 - x^2 - 30$

$$\{\sqrt{6}, -\sqrt{6}, i\sqrt{5}, -i\sqrt{5}\}$$

18) $f(x) = x^4 + x^2 - 12$

$$\{2i, -2i, \sqrt{3}, -\sqrt{3}\}$$

19) $f(x) = x^6 - 64$

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

20) $f(x) = x^6 + 2x^3 + 1$

$$\left\{-1 \text{ mult. } 2, \frac{1 + i\sqrt{3}}{2} \text{ mult. } 2, \frac{1 - i\sqrt{3}}{2} \text{ mult. } 2\right\}$$