

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

## Factors and Zeros

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

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