

Given the information provided, create a polynomial function in **STANDARD FORM**.

1. Zeros: 3 (multiplicity 2)      Degree: 4  
      -1 (multiplicity 2)

Function: \_\_\_\_\_

2. Zeros: 3, -1, 2i      Degree: 4

Function: \_\_\_\_\_

Finding zeros of  $f(x)$ .

3. Given  $x = -2$  is a solution of  $f(x) = x^3 + 2x^2 + 5x + 10$ , find all solutions.

4.  $f(x) = x^3 - 9x^2 + 25x - 25$ . Find all zeros, provided that one zero is 5.

5.  $f(x) = x^3 - 10x^2 + 29x - 26$ . Find all zeros given that  $(x - 2)$  is a factor of  $f(x)$ .

6. Find **ALL** zeros of  $f(x)$ .

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

All Zeros: \_\_\_\_\_

7. Use the Decartes' Rule of Signs to determine the following.

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

# of Possible Positive Zeros: \_\_\_\_\_ Negative: \_\_\_\_\_

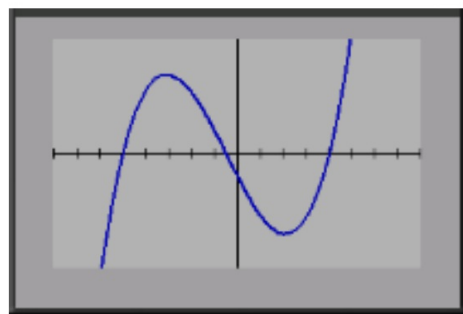
8. List the possible rational zeros of the polynomial function.

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

Possible Rational Zeros: \_\_\_\_\_

9. Find **ALL** zeros of the polynomial function.

$$f(x) = 2x^3 + 3x^2 - 39x - 20$$



| 10. | Function                                 | Vertical Asymptote | Horizontal Asymptote | Slant Asymptote | Hole  |
|-----|--|--------------------|----------------------|-----------------|-------|
| A   | $f(x) = \frac{2x-1}{3x}$                 |                    |                      | Yes or No       | ( , ) |
| B   | $f(x) = \frac{5x}{x^2-4}$                |                    |                      | Yes or No       | ( , ) |
| C   | $f(x) = \frac{x^4+x^3-2}{(x-3)(x+1)}$    |                    |                      | Yes or No       | ( , ) |
| D   | $f(x) = \frac{x}{x^2-1}$                 |                    |                      | Yes or No       | ( , ) |
| E   | $f(x) = \frac{x^2+4}{x-5}$               |                    |                      | Yes or No       | ( , ) |
| F   | $f(x) = \frac{2(x-1)(x+3)}{(x+6)(x+3)}$  |                    |                      | Yes or No       | ( , ) |
| G   | $f(x) = \frac{(x+3)(x-2)}{(x-2)(x+4)}$   |                    |                      | Yes or No       | ( , ) |
| H   | $f(x) = \frac{(x-5)(x+3)^2}{(x+1)(x+2)}$ |                    |                      | Yes or No       | ( , ) |

Find the slant asymptote.

11.  $f(x) = \frac{x^3+4x^2-6x+5}{x^2+3}$

12.  $f(x) = \frac{2x^2+5x-12}{4x+4}$

CHALLENGE (You're welcome to skip this one.)

13.  $f(x) = \frac{x^2 - 4}{x^2 + x - 2}$

hole : \_\_\_\_\_

|     |         |           |
|-----|---------|-----------|
| VA: | Domain: | Graph<br> |
| HA: | Range:  |           |

|    |   |                  |   |
|----|---|------------------|---|
| 14 | $f(x) = \frac{3x}{x^2 - 25}$ , VA is...         | $x = 5$          | $x = \pm 5$                             |
| 15 | $f(x) = \frac{x-3}{(x+4)(x-3)}$ , VA is...      | $x = -4$         | $x = -4, 3$                             |
| 16 | $f(x) = \frac{8x+2}{2x^2-1}$ , HA is...         | $y = 0$          | $y = 4$                                 |
| 17 | $f(x) = \frac{x^2+2x-5}{3x^2+4}$ , HA is...     | $y = 1$          | $y = \frac{1}{3}$                       |
| 18 | $f(x) = \frac{x^4+2x^3+x-3}{x^2-4}$             | Slant Asymptote  | No Slant Asymptote                      |
| 19 | $f(x) = \frac{x-3}{(x+4)(x-3)}$ , Find the hole | $(3, 0)$         | $(3, \frac{1}{7})$                      |
| 20 | Possible rational zeros: $f(x) = 2x^4 + x - 5$  | $\pm\{1, 2, 5\}$ | $\pm\{1, \frac{1}{2}, 5, \frac{5}{2}\}$ |