

Name: _____
Rationals & Polynomials

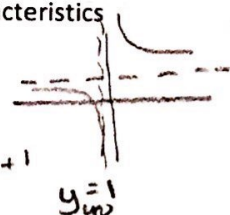
Graph & Name all the characteristics

1.) $f(x) = \frac{3}{x} + 1$

$x \text{ int} = 0 = \frac{3}{x} + 1$

$-1 = \frac{3}{x}$

$x = -3$



hole $x = -3$
 $y = 0$
 $x = y$: none
 $y = \frac{1}{2}$
2.) $f(x) = \frac{-x-3}{x^2+x-6}$



3.)

$f(x) = \frac{x^3 - 9x}{4x^2 - 8x}$



4.)
Obli: $y = \frac{1}{4}x + \frac{1}{2}$
hole: 0
 $x \text{ int}: \pm 3$
 $y \text{ int}: \text{none}$

$f(x) = \frac{2x^3 - 4x^2 - 16x}{x^3 - 6x^2 + 8x}$

$h x = 0 \quad x = 4$
 $D x \pm 2, 0, 4$



Find all zeros.

5) $f(x) = 27x^3 - 64$ $\frac{4}{3}, \frac{-2 \pm 2i\sqrt{3}}{3}$

6) $f(x) = 3x^3 - 5x^2 - 11x - 3$ $\frac{2}{3}, -\frac{1}{3}, -1, 3$

7) $f(x) = 4x^3 + 8x^2 + 5x + 1$

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

8) $f(x) = 5x^3 - 32x^2 - 33x + 18$ $4, -3, 5, 4$

$\frac{2}{3}, 3 \pm 3\sqrt{2}$

Solve each equation. Remember to check for extraneous solutions.

9) $\frac{1}{x} = \frac{1}{x^2 - 7x} + \frac{4}{x}$ $\frac{20}{3}$

10) $\frac{6}{m-6} + 3 = \frac{1}{m-6}$ $\frac{13}{3}$

Simplify:

11) $\frac{4}{3n-5} + \frac{5}{3n-3} = \frac{27n-37}{3(n-1)(3n-5)}$

12) $\frac{2p}{15p^2+6p} - \frac{2p}{3} = \frac{2-10p^2-4p}{3(5p+2)}$

13) $\frac{6a}{a+4} + \frac{3a}{a+2} = \frac{9a^2+24a}{(a+4)(a+2)}$

14) $\frac{5x}{2x+4} + \frac{6}{2} = \frac{11x+12}{2(x+2)}$

15) $\frac{1}{r+3} \cdot \frac{r^2-7r-30}{4r} = \frac{r-10}{4r}$

16) $\frac{1}{x+7} = \frac{45x^2+9x}{30x+6} = \frac{2}{3x(x+7)}$

$$17) \frac{\frac{4}{25} + \frac{2}{5x}}{\frac{4}{x^2}}$$

$$\frac{2x^2 + 5x}{50}$$

$$18) \frac{25}{\frac{5x}{3x-4} + \frac{25}{3x-4}}$$

$$\frac{15x-20}{x+5}$$

Solve each equation.

$$19) (m+18)^{\frac{3}{5}} = 8 \quad 14$$

$$20) 516 = (v+4)^{\frac{3}{2}} + 4 \quad 60$$

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

$$21) \sqrt{10} \text{ mult. } 2 \quad f(x) = x^4 - 20x^2 + 100$$

$$22) 2i, 2\sqrt{2} \quad f(x) = x^4 - 4x^2 - 32$$

Divide.

$$23) (9r^3 + 62r^2 + r + 62) \div (r+7)$$

$$9r^2 - r + 8 + \frac{6}{r+7}$$

$$24) (x^3 - 8x^2 + 6x + 36) \div (x-5)$$

$$x^2 - 3x - 9 - \frac{9}{x-5}$$

Find all zeros.

$$25) f(x) = 6x^5 - 9x^4 + 52x^3 - 78x^2 + 96x - 144$$

$$\frac{3}{2}; \pm \frac{2\sqrt{6}}{3}; \pm 2\sqrt{6}$$

$$26) f(x) = 2x^3 + 3x^2 - 1$$

$$\frac{1}{2}; -1 \text{ m } 2$$

Factor each. One root has been given.

$$27) x^5 - 5x^4 + 13x^3 - 19x^2 + 10x = 0; 1+2i$$

$$x(x-1)(x-2)(x^2-2x+5) = 0$$

$$28) x^4 - 16x^3 + 62x^2 + 16x - 288 = 0; 4 + \sqrt{34}$$

$$(x-4)^2(x^2-8x-18) = 0$$

Find the polynomial given the zeros.

$$29.) \quad x = 4, \text{ multiplicity of } 2$$

$$x = -3, \text{ multiplicity of } 1$$

$$(x-4)(x-4)(x+3) = 0$$

$$(x^2 - 8x + 16)(x+3) = 0$$

$$x^3 - 8x^2 + 16x + 3x^2 - 24x + 48 = 0$$

$$x^3 - 5x^2 - 8x + 48 = 0$$

Sketch the graph given:

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

9th
E

