

Review Worksheet #2-2

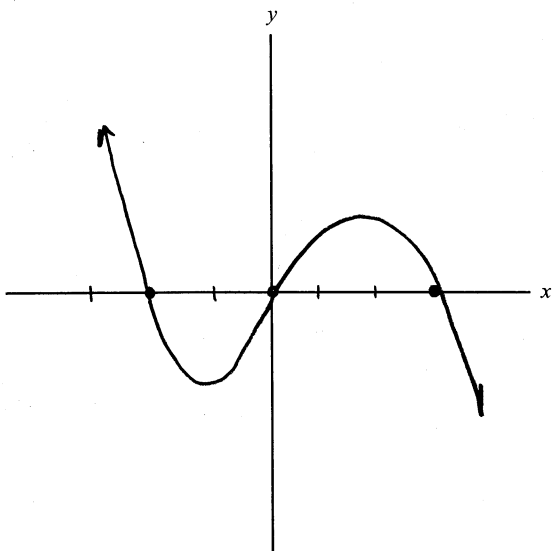
1) Indicate the degree and the zeros for the following polynomial function:

$$y = x(x^2 - 4)(3x + 5)(x - 1)$$

degree = 5th

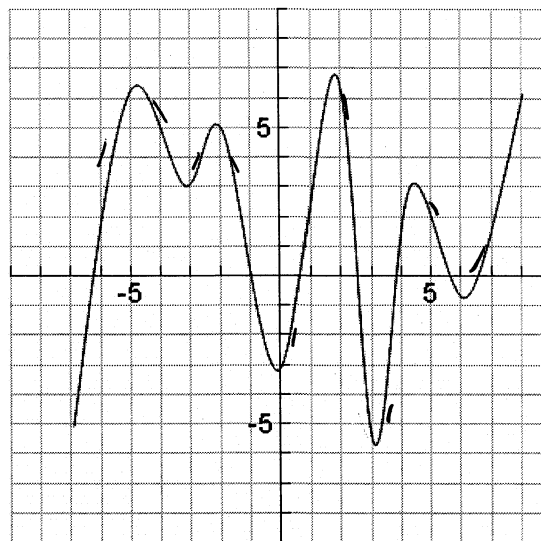
zeros = 0, ±2, -5/3, 1

2) Sketch a graph of a polynomial that has zeros at 3, 0, -2 and has a negative leading coefficient.



3) For the following graph of a polynomial indicate its degree and how many real and non-real zeros there are.

Degree = 9th
 Real Zeros: 7
 Non-Real zeros: 2



4) Solve the following by factoring. All steps must be shown.

a) $3x^3 - 27x = 0$
 $3x(x^2 - 9) = 0$
 $x = 0, ±3$

b) $6x^2 + 19x + 15 = 0$

$3x$	5	$10x$
$2x$	3	$9x$
		$19x$

$(3x+5)(2x+3) = 0$
 $x = -\frac{5}{3}, -\frac{3}{2}$

- 5) Solve the following polynomial using a graphing calculator: (2 decimal places)

$$x^4 + x^3 = 9x^2 - 5$$

$$y = x^4 + x^3 - 9x^2 + 5$$

Zeros @ $-3.47, -0.74, 0.82, 2.39$

- 6) Solve for the value(s) of k for the following equation, $4x^2 + kx + 36 = 0$, such that both roots are equal.

$$4(x-r)(x-r) = 0$$

$$4(x^2 - 2rx + r^2) = 0$$

$$4x^2 - 8rx + 4r^2 = 0$$

$$4r^2 = 36$$

$$r^2 = 9$$

$$r = \underline{\underline{\pm 3}}$$

$$k = -8r \quad \therefore k = -8(\pm 3) = \underline{\underline{\pm 24}}$$

- 7) Give the equations for the following functions.

- a) zeros of $5, 2, 3, -1$

$$y = (x-5)(x-2)(x-3)(x+1)$$

- b) zeros of $1, -2, -5$ and passes through $(-1, -8)$

$$y = a(x-1)(x+2)(x+5)$$

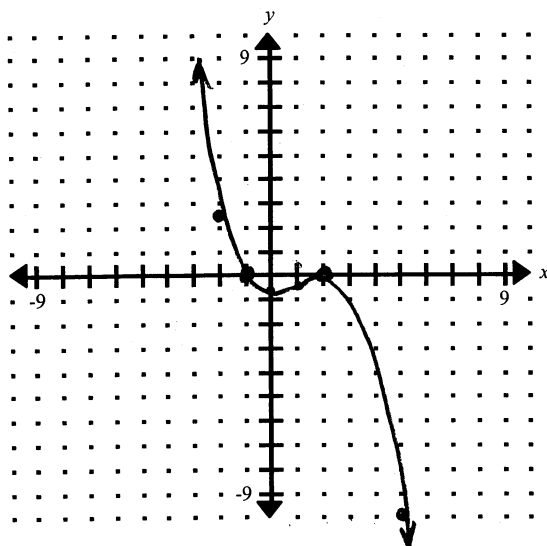
$$-8 = a(-2)(1)(4)$$

$$-8 = -8a$$

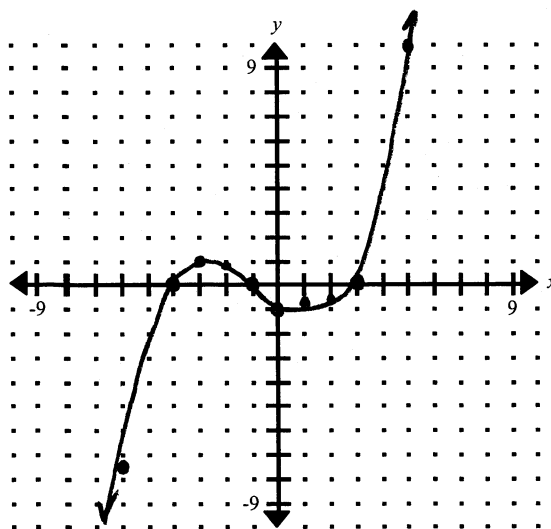
$$1 = a \quad \therefore y = (x-1)(x+2)(x+5)$$

- 8) Graph the following functions on the grids provided.

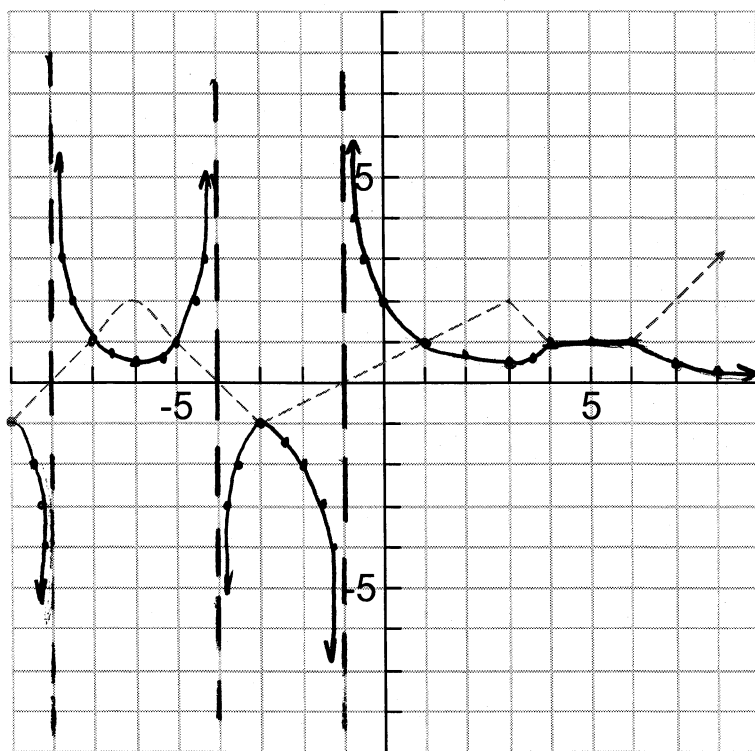
a) $y = -\frac{1}{6}(x-2)^2(x+1)$



b) $y = \frac{1}{12}(x+4)(x+1)(x-3)$



9) Graph the reciprocal of the following function.



10) Rational Functions

a) $y = \frac{x^2 - 9}{2x^2 - 16x + 30}$

$y = \frac{(x+3)(x-3)}{2(x-5)(x-3)}$

Restrictions: $x \neq 5, 3$

Vertical asymptote (eqn) $x = 5$

Hole? (where?) Yes (3, -3/2)

Domain $x \neq 5 \text{ \& } 3$

Horizontal asymptote (eqn) $y = \frac{1}{2}$

Slant asymptote (Yes or No)

Range: $y \neq \frac{1}{2} \text{ \& } -\frac{3}{2}$

b) $y = \frac{7x - 14}{7x^2 + 7x - 14}$

$y = \frac{7(x-2)}{7(x+2)(x-1)}$

Restrictions: $x \neq -2, 1$

Vertical asymptote (eqn) $x = 2 \text{ \& } 1$

Hole? (where?) None

Domain $x \neq -2, 1$

Horizontal asymptote (eqn) $y = 0$

Slant asymptote (Yes or No)

Range: $y < 0 \text{ \& } y > 1$
(2nd, trace, min)

$$c) y = \frac{5x^3 - 20x}{x^3 + 10x^2 - 24x}$$

Vertical asymptote (eqn) $x = -12$ Horizontal asymptote (eqn) $y = 5$

$$y = \frac{5x(x+2)(x-2)}{x(x+12)(x-2)}$$

Hole? (where?) $yes @ (2, \frac{10}{7})$ Slant asymptote (Yes or No) No

Domain $x \neq 0, -12, 2$ Range: $y \neq 5, \frac{10}{7}, \frac{5}{6}$

Restrictions: _____

$$y = \frac{20}{14} \quad y = \frac{10}{12}$$

12) If $f(x) = 3x - 4$ and $g(x) = x^2 - 1$, determine the following.

a) $f(3) = \underline{3(3) - 4 = 5}$

b) $3g(-2) = \underline{3 \cdot ((-2)^2 - 1) = 3 \cdot 3 = 9}$

c) If $g(x)$ equals 17, solve for 'x'. $x^2 - 1 = 17$ $x^2 = 18$ $x = \pm\sqrt{18}$

d) $f(g(x)) = \underline{3(x^2 - 1) - 4 = 3x^2 - 3 - 4 = 3x^2 - 7}$ $x = \pm 3\sqrt{2}$

e) $g(f(x)) = \underline{(3x - 4)^2 - 1 = 9x^2 - 24x + 16 - 1}$
 $= 9x^2 - 24x + 15$

13) Determine the equation a polynomial has roots $\frac{2}{3}$ and $\frac{3}{4}$.

$$(x - \frac{2}{3})(x - \frac{3}{4}) = 0$$

$$(3x - 2)(4x - 3) = 0$$

$$12x^2 - 17x + 6 = 0$$