Chapter 5 Practice Test

1) $f(x) = (x-4)^2(2x+6)$

a) List each x-intercept (zero) and its multiplicity (round to 2 decimal places when needed)

$$(4,0) mulitplicity\ 2 - even \quad (-3,0)\ multiplicity\ 1 - odd$$

b) Determine whether the graph crosses or touches the x-axis at each x-intercept

$touches\ (4,0)\ crosses\ at\ (-3,0)$

c) Determine the maximum number of turning points on the graph $\max 2\ turning\ points$

d) Sketch a graph and approximate the turning points, also label the x-intercepts (see graph)

e) Describe the end behavior (find the power function that the graph resembles for large values of $|x|$

$f(x) = 2x^3$

f) State the intervals where the function is increasing and decreasing

$(-\infty, -0.67) \cup (4, \infty)$ $\quad (-0.67, 4.)$

$increasing$ [redacted]) $\cup$ [redacted]) $decreasing$ [redacted]

a) $(x-4)^2 = 0$

$x = 4$

$(4,0)$

mult 2

Even

$2x+6=0$

$2x = -6$

$x = -3$

$(-3,0)$

mult 1

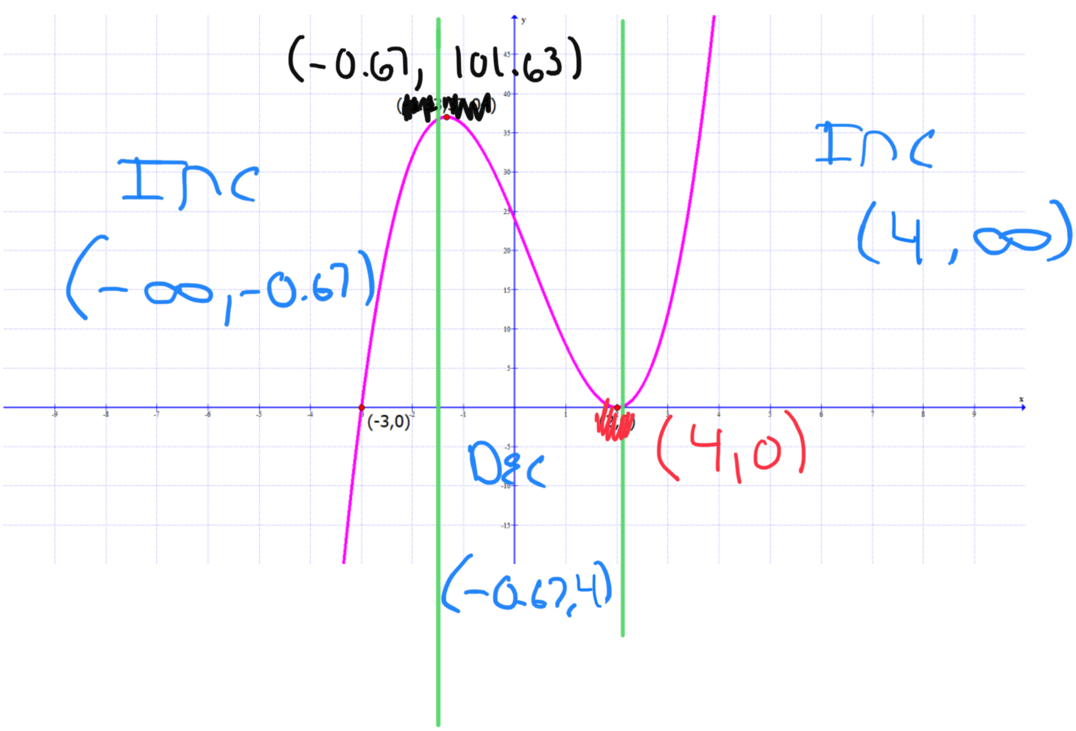
ODD

b) Touches at $(4,0)$ Crosses

c) $x \cdot x \cdot 2x = 2x^3$

max $3-1=2$ turning points

e) $f(x) = 2x^3$



2) Form a polynomial function of lowest degree with whose x-intercepts are given, that passes through the given point.

x-intercepts: (2,0), (-5,0) multiplicity 2; point (3, 128)

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

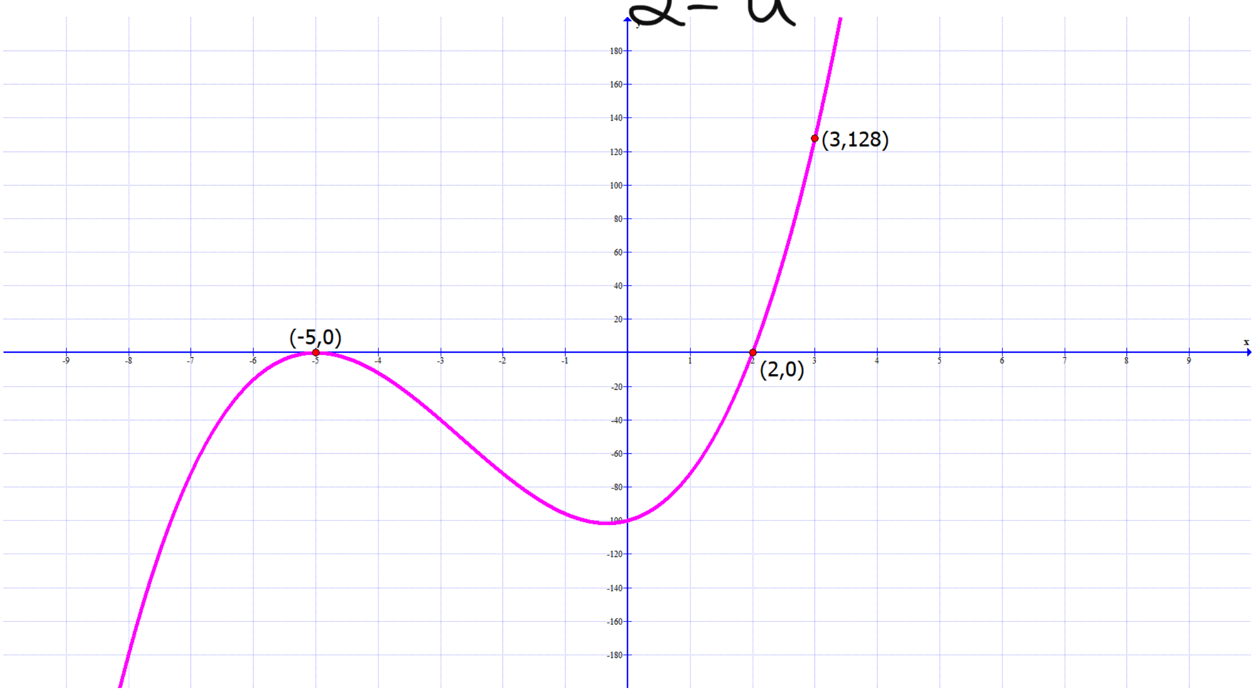
$$128 = a(3-2)(3+5)^2$$

$$128 = a(1)(64)$$

$$\frac{128}{64} = \frac{64a}{64}$$

$$2 = a$$

Graph of $f(x) = 2(x-2)(x+5)^2$



3) $f(x) = 6x^3 - 29x^2 - 17x + 60$

a) use your graphing calculator, or the rational root theorem to find a x-intercept of the polynomial $(x = 5)$

b) use synthetic division to completely factor the polynomial $f(x) = (2x + 3)(3x - 4)(x - 5)$

c) Use your answer to part a to solve f(x) = 0 $x = 5, \frac{-3}{2}, \frac{4}{3}$

b)

	6	-29	-17	60
5		30	5	-60
	6	1	-12	0

$f(x) = (x-5)(6x^2 + x - 12)$

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

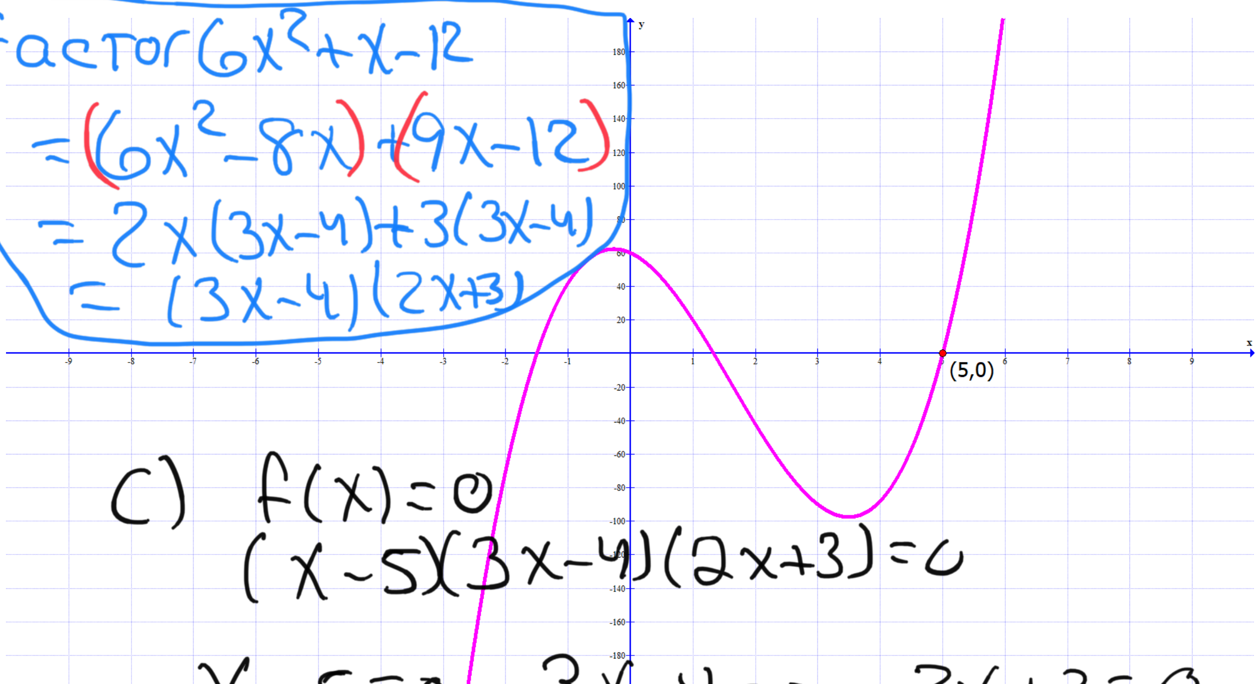
Graph of $f(x) = 6x^3 - 29x^2 - 17x + 60$

Factor $6x^2 + x - 12$

$= (6x^2 - 8x) + (9x - 12)$

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

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



c) $f(x) = 0$

$(x-5)(3x-4)(2x+3) = 0$

$x - 5 = 0$ $\quad$ $3x - 4 = 0$ $\quad$ $2x + 3 = 0$

$x = 5$ $\quad$ $3x = 4$ $\quad$ $2x = -3$

$x = \frac{4}{3}$ $\quad$ $x = -3/2$

$x = 5, 4/3, -3/2$

4) Create a function with lead coefficient 1 that satisfies the conditions.

degree 2; zeros 5i and -5i

$x = 5i \qquad x = -5i$

$x - 5i = 0 \qquad x + 5i = 0$

$f(x) = (x - 5i)(x + 5i)$

$f(x) = x^2 + 25$

$f(x) = x^2 + \cancel{5xi} - \cancel{5xi} - 25i^2$

$-25(-1)$

$f(x) = x^2 + 25$

5) $f(x) = \frac{6x-12}{x+1}$

For each problem find the following:

a) the domain of $f(x)$ written in interval notation $(-\infty, -1) \cup (-1, \infty)$

b) the equation of the vertical asymptote (write none if there is no vertical asymptote) $x = -1$

c) the equation of the horizontal asymptote (write none if there is no horizontal asymptote) $y = 6$

d) x- intercept(s) if any $(2,0)$

e) y-intercept(s) if any $(0, -12)$

(you do not need to graph the function)

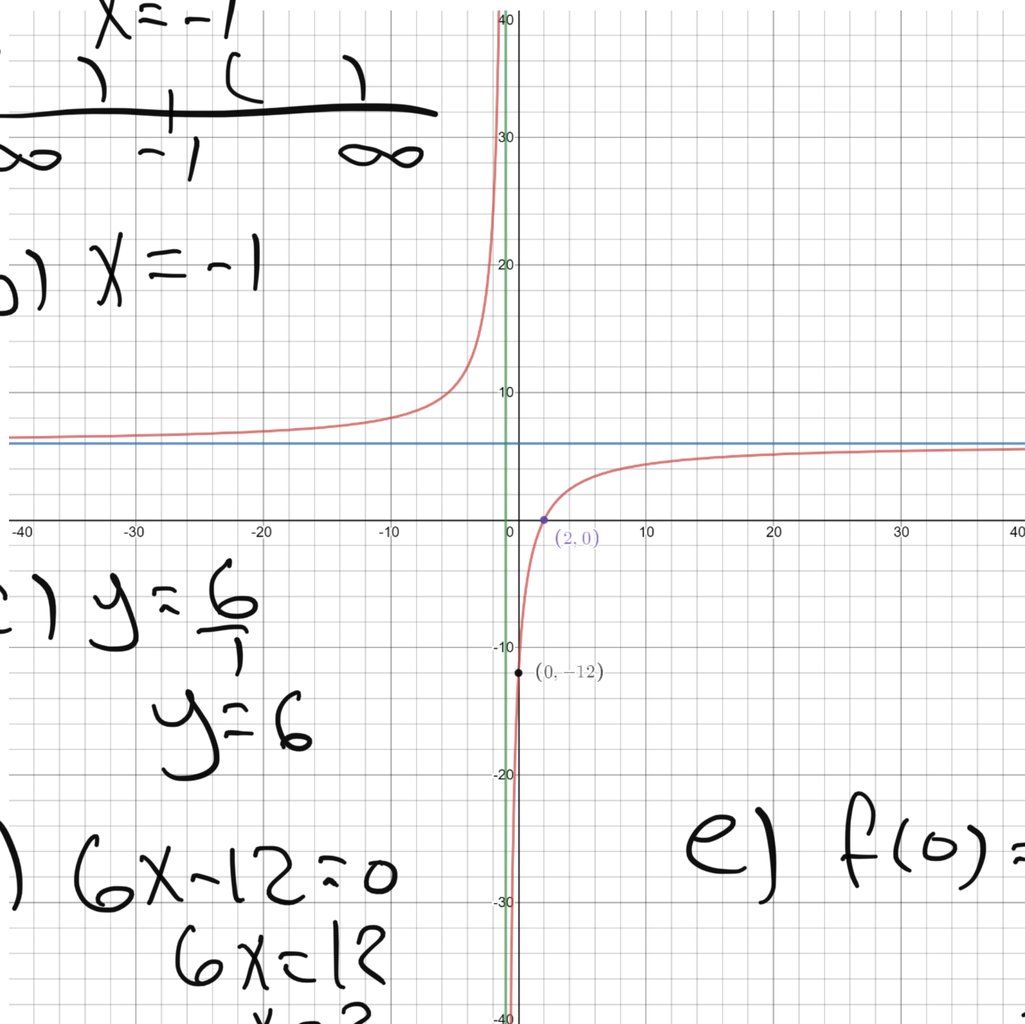
a) $X+1=0$

$X=-1$

$($ $)$ $($ $)$

$-\infty$ -1 ∞

b) $X=-1$



c) $y = \frac{6}{1}$

$y=6$

d) $6X-12=0$

$6X=12$

$X=2$

$(2,0)$

e) $f(0) = \frac{6(0)-12}{0+1}$

$= -12/1$

$= -12$

$(0,-12)$

6) $f(x) = \frac{x^2+2x-15}{x-1}$

For each problem find the following:

a) the domain of $f(x)$ written in interval notation $(-\infty, 1) \cup (1, \infty)$

b) the equation of the vertical asymptote (write none if there is no vertical asymptote) $x = 1$

c) the equation of the slant asymptote (write none if there is no slant asymptote) $y = x + 3$

d) x- intercept(s) if any $(-5,0)$ $(3,0)$

e) y-intercept(s) if any $(0,15)$

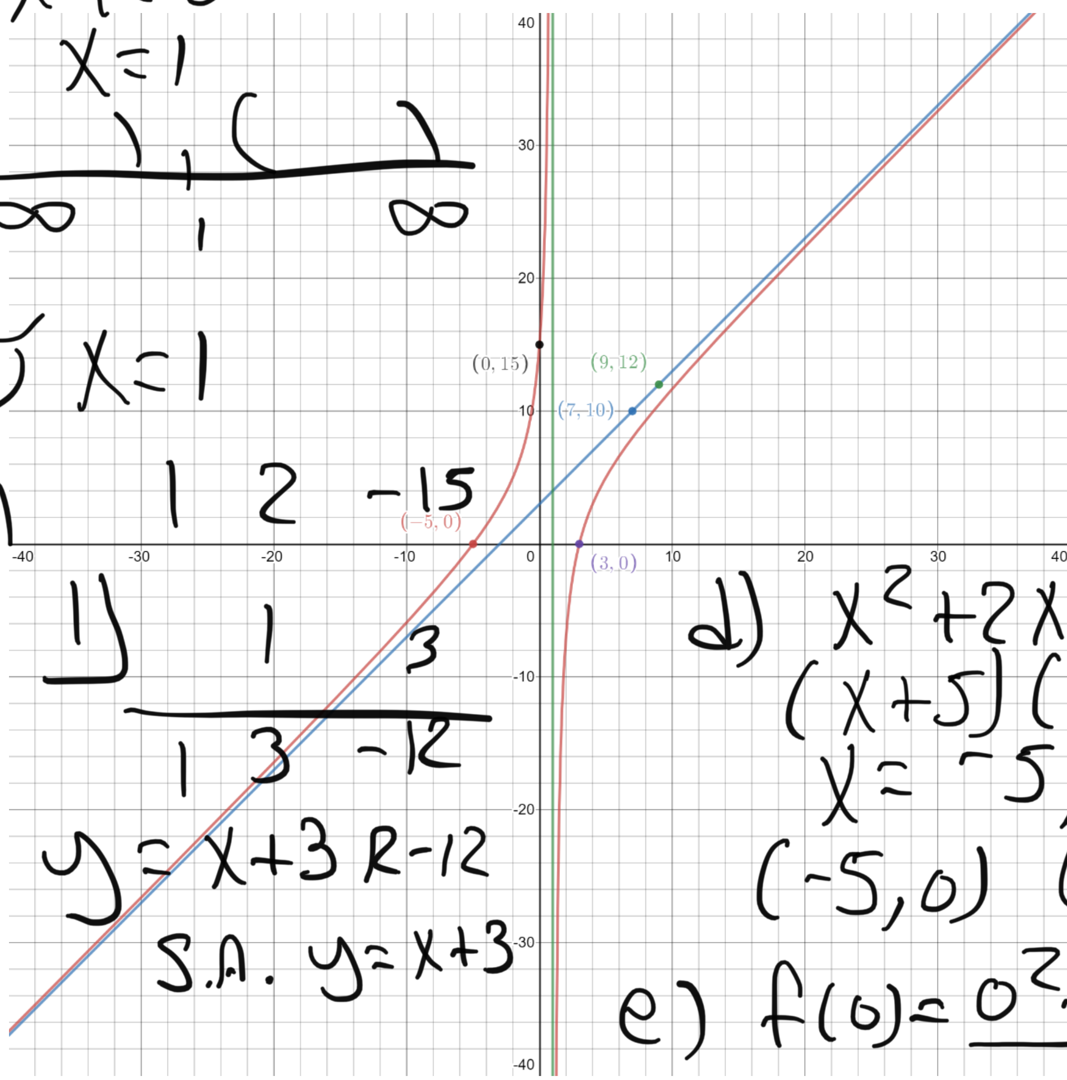
(you do not need to graph the function)

a) $X-1=0$

$X=1$

$(-\infty, 1), (1, \infty)$

b) $X=1$



c) $1 \,|\, 1 \quad 2 \quad -15$

$\quad\;\; 1 \quad 3$

$\quad\;\; 1 \quad 3 \quad -12$

$y = X+3 \quad R -12$

S.A. $y = X+3$

d) $X^2+2X-15=0$

$(X+5)(X-3)=0$

$X=-5, \quad X=3$

$(-5,0) \quad (3,0)$

e) $f(0) = \frac{0^2+2(0)-15}{0-1}$

$= \frac{-15}{-1}$

$= 15$

$(0, 15)$