

NO CALCULATORS!!

1) Write the quadratic function in vertex form: $f(x) = -3x^2 - 12x + 6$

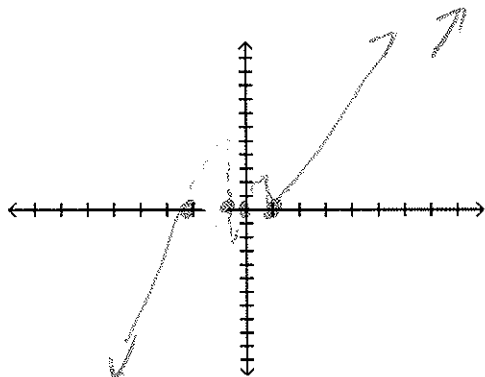
$$-3(x^2 + 4x + 4) + 6 + 12$$

$$-3(x+2)^2$$

Vertex form: $y = -3(x+2)^2 + 18$

2) Sketch analyze the function: $5x(x)^2(y)^3(3x)$

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



a) Degree: 7

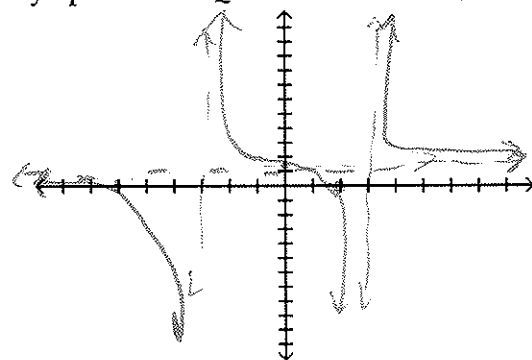
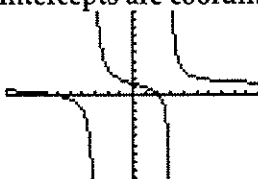
b) Leading Coefficient: 15

c) Zeros and Multiplicity: 0, -1/3
1 multi 2, -2 multi 3

d) $\lim_{x \rightarrow \infty} f(x) = \infty$ $\lim_{x \rightarrow -\infty} f(x) = -\infty$

3) List the x- and y-intercepts, and asymptote. Then sketch the graph using the function AND the given calculator graph below. USE CORRECT NOTATION!!!!(intercepts are coordinates, asymptotes are EQUATIONS of lines)

$$f(x) = \frac{x^2 + 4x - 12}{x^2 - 9} \quad (x+6)(x-2)$$



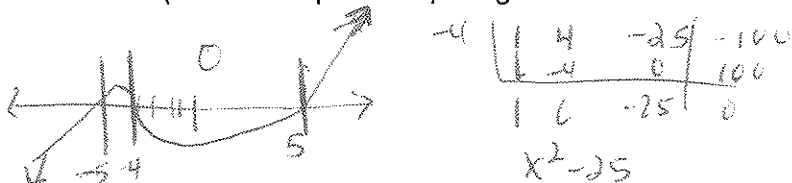
V.A. $x=3, x=-3$ H.A or S.A. $y=1$

x-int. $(-6, 0)(2, 0)$ y-int. $(0, 4/3)$

4) Solve the polynomial inequality by finding the critical values and creating a sketch. Then, put your answer in interval notation. (Hint -4 is one of the zeros) $x^3 + 4x^2 - 25x - 100 \leq 0$

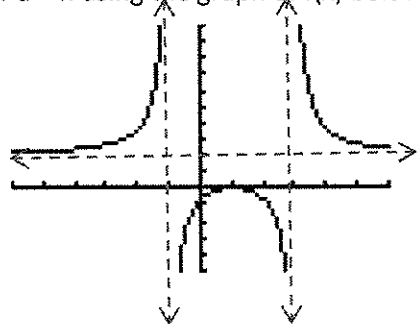
Sketch(with intercepts noted) or sign chart:

Critical Values: $-4, -5, 5$



4) Answer(Interval Notation): $(-\infty, -5] \cup [4, 5]$

5) Answer a - h using the graph of f(x) below.



- 5)
- a. $\lim_{x \rightarrow \infty} f(x) = \underline{2}$
 - b. $\lim_{x \rightarrow -\infty} f(x) = \underline{2}$
 - c. $\lim_{x \rightarrow 3^+} f(x) = \underline{\infty}$
 - d. $\lim_{x \rightarrow 3^-} f(x) = \underline{-\infty}$
 - e. $\lim_{x \rightarrow -1^+} f(x) = \underline{-\infty}$
 - f. $\lim_{x \rightarrow -1^-} f(x) = \underline{\infty}$
 - g. $f(+3) = \underline{\emptyset}$
 - h. $f(0) = \underline{0}$