Refresher Course Math 1050 and 1060 Practice Problems Set 5 Fall 2007

1.) Find a parabola whose vertex is (2,-3) opening down passing through the point (0,-11).

$y = a(x-2)^2 - 3$ when $x = 0$ $y = -11$ so

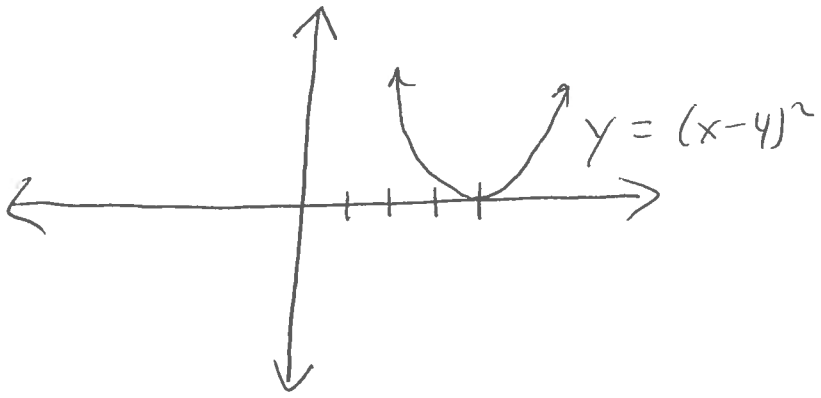
$-11 = a(-2)^2 - 3$ $\quad -11 = 4a - 3$ $\quad -8 = 4a$ $\quad -2 = a$

$$\boxed{y = -2(x-2)^2 - 3}$$

2.) Graph $f(x) = x^2 - 8x + 16$ by identifying the y-intercepts, x-intercepts, and vertex.

$f(x) = (x-4)^2$ vertex at $(4,0)$

y-intercept is 16. x-intercept is a repeated root at $x = 4$.



3.) Describe the graph of $f(x) = (x-3)^2(x+2)^3$.

Zeros at $x = 3$, $x = -2$

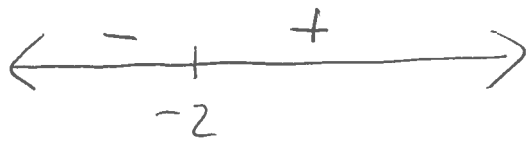
Sign change at $x = -2$

Touches (x-axis) at $x = 3$

$\lim x \to \infty$ is ∞

$\lim x \to -\infty$ is $-\infty$

Sign line

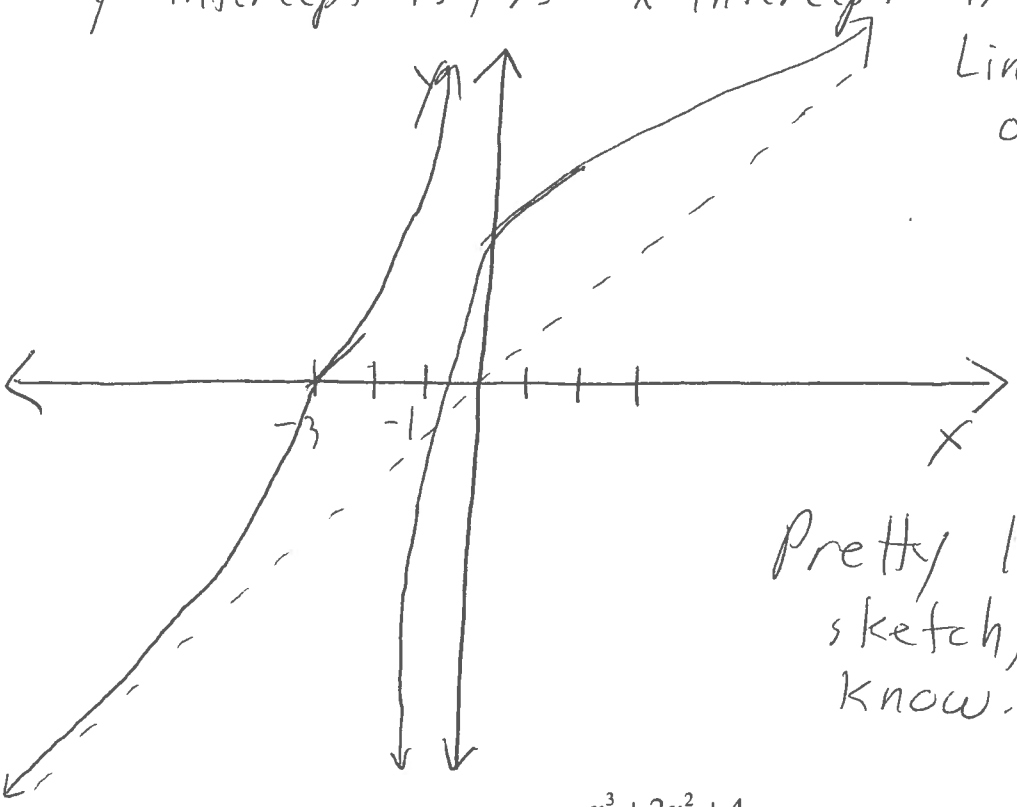


4.) Sketch the graph of $f(x)=\dfrac{x^2-9}{x^2-2x-3}$. Make sure you find the y-intercepts, x-intercepts, vertical asymptotes, horizontal asymptotes, and some additional points.

$f(x) = \dfrac{(x+3)(x-3)}{(x-3)(x+1)} = \dfrac{x+3}{x+1}$ Vertical asymptote at $x=-1$.

y-intercept is $y=3$. x-intercept is $x=-3$.

Linear asymptote of $y=x$



Pretty lame sketch, I know.

5.) Find the slanted asymptotes of $f(x)=\dfrac{x^3+2x^2+4}{2x^2+1}$. Why do we know it has a slanted asymptote?

$y = \frac{1}{2}x$

Because the degree of the numerator is 1 greater than the degree of the denominator.