Name: _Solution_

Math 32, Spring 2010, Section 101
Quiz 5

(1) (3 pts) Find the domains of the following functions.

a) $f(x) = \frac{1}{2^{x-1}}$

b) $g(x) = \frac{1}{2^x - 1}$

Since $2^{x-1} \neq 0$,

the domain of

f is all real

numbers $(-\infty, \infty)$

Any x such that $2^x - 1 = 0$ is

not in the domain i.e.

we cannot have $2^x = 1 \iff x = 0$.

So the domain is all numbers

besides 0 $(-\infty, 0) \cup (0, \infty)$

(2) (3 pts) Graph the curve $y = (x+1)^2(x-1)(x-3)$. Give the coordinate(s) of any x-intercepts, y-intercepts, and any vertical or horizontal asymptotes.

x-intercepts: $(-1, 0)$, $(1, 0)$, $(3, 0)$

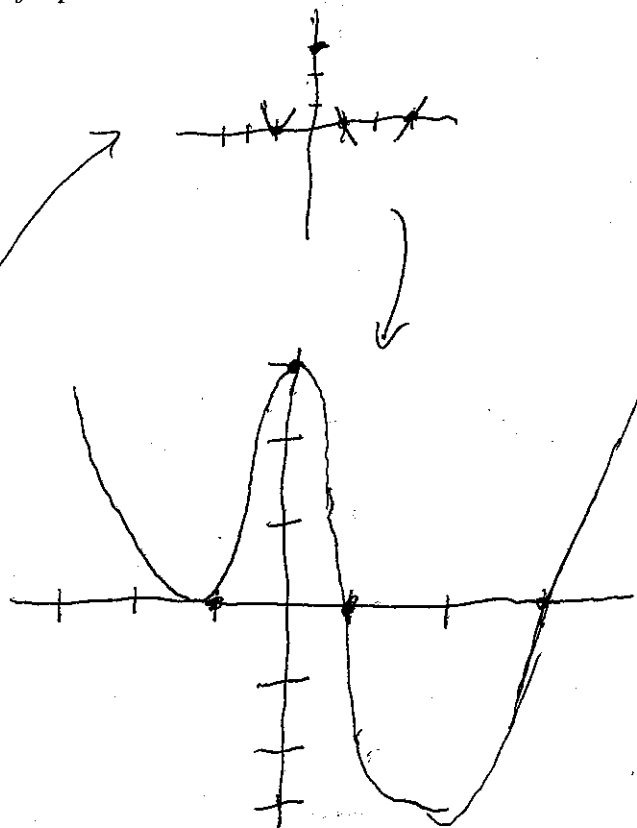y-intercept: $(0, 3)$

No asymptotes

Near $x = -1$, $y \approx (x+1)^2(-1-1)(-1-3)$

$= 8(x+1)^2$

Near $x = 1$, $y \approx (1+1)^2(x-1)(1-3)$

$= -12(x-3)$

Near $x = 3$, $y \approx (3+1)^2(3-1)(x-3)$

$= 32(x-3)$

(3) (4 pts) Graph the curve $y = \dfrac{3x^2}{(x-1)(x+3)}$. Give the coordinate(s) of any x-intercepts, y-intercepts, and any vertical or horizontal asymptotes.

x-intercepts: $(0,0)$

y-intercept: $(0,0)$

Vertical asymptotes: $x=1$, $x=-3$

horizontal asymptote: $y=3$

Key #'s $\quad -3, 0, 1$

Near $x=-3$, $\quad y \approx -\dfrac{27}{4} \dfrac{1}{(x+3)}$

Near $x=0$, $\quad y \approx -x^2$

Near $x=1$, $\quad y \approx \dfrac{3}{4} \dfrac{1}{x-1}$