Math 156 PRECALCULUS
Fall 2015

Quiz 6 – Version A and Version ONE

Thursday, October 22, 2015

Name: Solutions

This quiz has 6 problems worth a total of 30 points. It is TWO SIDED.

(6 points) Let $g(x) = \frac{8x^3}{x^3+6x^2+8x}$.

(a) Find all horizontal asymptotes, if any exist.

$y=8$ (Pick off leading coefficients)

(b) Find all vertical asymptotes, if any exist.

$x^3+6x^2+8x = x(x^2+6x+8) = x(x+2)(x+4) = 0$

when $x=0, x=-2, x=-4$ BUT $x=0$ is a hole not an asymptote.

ANS: $y=-2$, $y=-4$

§3.6 #31-62

(c) Find all y-intercepts, if any exist.

Set $x=0$: $g(0)$ undefined. No y-intercepts

(d) ~~Find all x-intercepts, if any exist.~~

No x-intercepts

(4 points) Solve the inequality $\frac{x-3}{2x+5} \geq 1$.

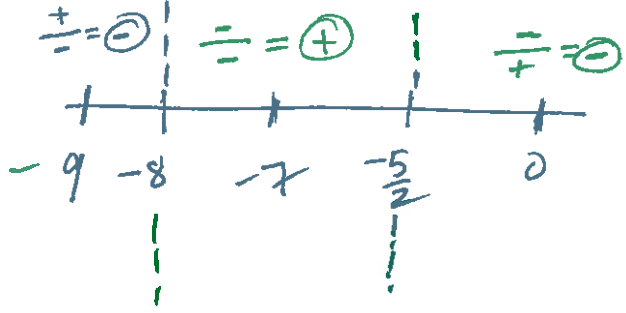
§3.7 # 17-36

$$\frac{x-3}{2x+5} - 1 \geq 0$$

$$\frac{x-3-(2x+5)}{2x+5} = \frac{-x-8}{2x+5} = \frac{-(x+8)}{2x+5}$$

Zeros: $x=-8$, $x=-\frac{5}{2}$

$\frac{+}{-} = \ominus$ $\quad \frac{-}{-} = \oplus$ $\quad \frac{-}{+} = \ominus$



$[-8, -\frac{5}{2})$

§3.1 #9-24

(5 points) Let $f(x) = 5x^2 + 2x - 1$.

(a) Express f in standard form.

$f(x) = 5\left(x^2 + \frac{2}{5}x + \frac{1}{25} - \frac{1}{25}\right) - 1 = 5\left(x+\frac{1}{5}\right)^2 - 1 - \frac{1}{5} = 5\left(x+\frac{1}{5}\right)^2 - \frac{6}{5}$

ANS: $f(x) = 5\left(x+\frac{1}{5}\right)^2 - \frac{6}{5}$

(b) Find the vertex of f.

$\left(-\frac{1}{5}, -\frac{6}{5}\right)$

(6 points) Given $f(x) = -4(x+5)^2 + 9$, a quadratic function in standard form, answer the questions below.

(a) Find the y-intercept(s) of f, or state that none exist.

set $x=0$: $y = -4(5)^2 + 9 = -4(25) + 9 = -100 + 9 = -91$

$y = -91$

§3.1 # 9-24

(b) Find the x-intercept(s) of f, or state that none exist.

Set $y=0$: $0 = -4(x+5)^2 + 9$

$\frac{9}{4} = (x+5)^2$

$\pm\frac{3}{2} = x+5$

$x = -5 \pm \frac{3}{2}$

(c) Find the range of $f(x)$.

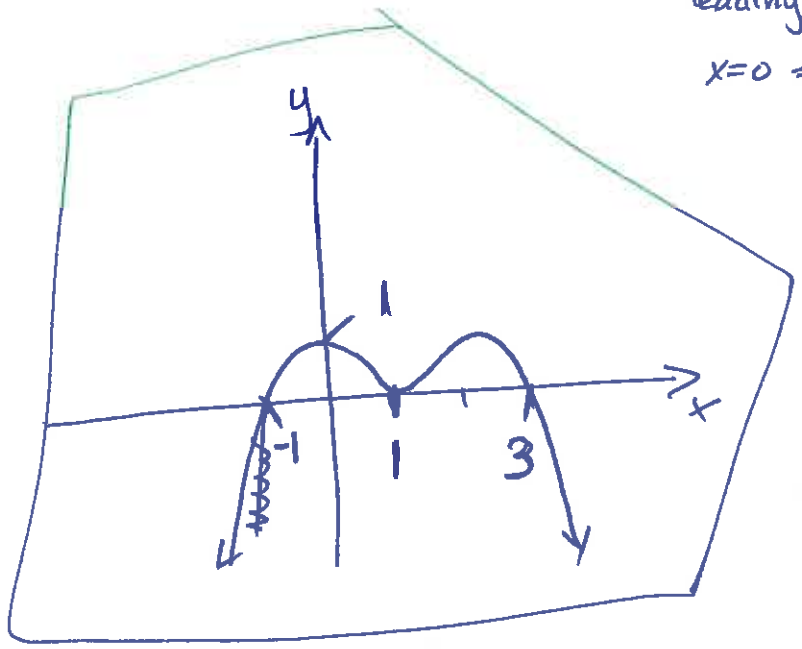
This is a parabola ~~opening~~ opening down.

Its vertex is $(-5, 9)$.

So ans: $(-\infty, 9]$

(5 points) For $P(x) = \frac{-1}{6}(x+2)(x-1)^2(x-3)$. Sketch the graph of $P(x)$. Label any x- or y-intercepts and exhibit the proper end behavior.

4th degree.
leading coeff is $-\frac{1}{6} < 0$, so it opens down
$x=0 \Rightarrow y = -\frac{1}{6}(2)(1)(-3) = 1$



§3.2 # 15-30

(4 points) Find the quotient, $Q(x)$, and remainder, $R(x)$, of $\frac{x^4+4x^3-8x^2+15}{x^2-3}$ using long division. **Make sure you identify them!**

$$
\begin{array}{r}
x^2+4x-5 \\
x^2-3 \;\overline{)\; x^4+4x^3-8x^2+15} \\
-(x^4 \quad -3x^2) \\
\hline
4x^3-5x^2 \\
-(4x^3 \quad -12x) \\
\hline
-5x^2+12x+15 \\
-(-5x^2 \quad +15) \\
\hline
12x
\end{array}
$$

$Q(x) = x^2+4x-5$

$R(x) = 12x$

§3.3 # 15-24