MATH 130 EXAM #2 REVIEW KEY – SPRING 2013

Problem #1

a) $(f+g)(x) = f(x)+g(x)$

$= (3x^2-4x+2)+(-4x^2+2x+8)$

$= -x^2-2x+10$

b.) $(f-h)(2) = f(2)-h(2)$

$= 6-(-4)$

$= 10$

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

$= 3\cdot 4 - 4\cdot 2 + 2$

$= 12-8+2 = 6$

$h(2) = -4(2)^2+2(2)+8$

$= -16+4+8$

$= -4$

c.) $\left(\frac{f}{h}\right)(x) = \frac{f(x)}{h(x)} = \frac{3x^2-4x+2}{-4x^2+2x+8}$

d.) $f(x-3) = 3(x-3)^2-4(x-3)+2 = 3(x^2-6x+9)-4x+12+2$

$= 3x^2-18x+9-4x+10$

$= 3x^2-22x+19$

e.) $g\circ h(x) = g(h(x)) = g(-4x^2+2x+8) = \frac{5(-4x^2+2x+8)}{(-4x^2+2x+8)-4} = \frac{-20x^2+10x+40}{-4x^2+2x+4}$

f.) $(h\circ f)(x) = h(f(x)) = h(3x^2-4x+2) = -4(3x^2-4x+2)^2+2(3x^2-4x+2)+8$

$= -4(9x^4-24x^3+28x^2-16x+4)+2(3x^2-4x+2)+8$

$= -36x^4+96x^3-112x^2+64x-16+6x^2-8x+4+8$

$= -36x^4+96x^3-106x^2+56x-4$

g) Domain $(f+g) = \{x \mid x \neq 4\}$

h.) Domain $(h\cdot k) = \{x \mid x \neq -5\}$

i.) Domain $\left(\frac{g}{k}\right) = \{x \mid x \neq 4, -5, 3\}$

$k(x) = \frac{x-3}{x+5} = 0$

$x-3 = 0$

$x = 3$

j.) Domain $(g\circ k) = \{x \mid x \neq -5, -23/5\}$

$\frac{x-3}{x+5} = 4$

$x-3 = 4x+20$ $\quad x = -23/5$

$-23 = 5x$

MATH 130 EXAM #2 REVIEW KEY - SPRING 2013

Problem #2

a.) $f(x) = x^2 - 6x + 9$

vertex: $x = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = 3$

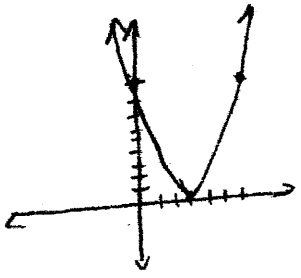
$f(3) = (3)^2 - 6(3) + 9$
$= 9 - 18 + 9 = 0$

$(3, 0)$

axis of symmetry: $x = 3$

x-intercept(s): $x^2 - 6x + 9 = 0$
$(x-3)^2 = 0$
$x - 3 = 0$
$x = 3$
$(3, 0)$

y-intercept: $y = 0^2 - 6(0) + 9 = 9$
$(0, 9)$



symmetric point $(6, 9)$

b.) $f(x) = 2x^2 - x + 2$

vertex: $x = \frac{-b}{2a} = \frac{-(-1)}{2(2)} = \frac{1}{4}$

$f(\frac{1}{4}) = 2(\frac{1}{4})^2 - \frac{1}{4} + 2$
$= \frac{1}{8} - \frac{1}{4} + 2 = \frac{1 - 2 + 16}{8} = \frac{15}{8}$
$(\frac{1}{4}, \frac{15}{8})$

axis of symmetry: $x = \frac{1}{4}$

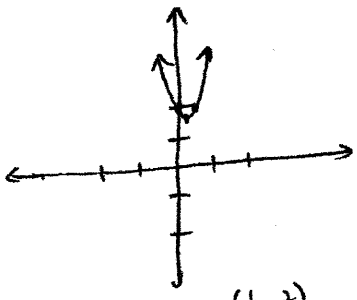
x-intercept(s): $2x^2 - x + 2 = 0$

$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(2)(2)}}{2(2)}$

$= \frac{1 \pm \sqrt{1 - 16}}{4} = \frac{1 \pm \sqrt{-15}}{4}$

$= \frac{1}{4} \pm \frac{i\sqrt{15}}{4}$ ← No x-intercepts.

y-intercept: $y = 2(0)^2 - (0) + 2 = 2$
$(0, 2)$



symmetric point $(\frac{1}{2}, 2)$

c.) $f(x) = 2x^2 + 5x + 3$

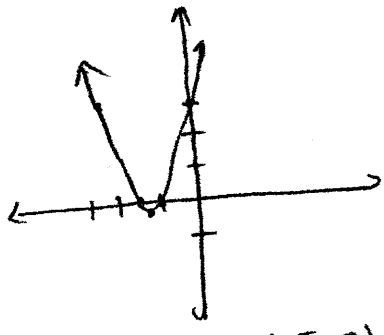
vertex: $x = \frac{-b}{2a} = \frac{-5}{2(2)} = -\frac{5}{4}$

$f(-\frac{5}{4}) = 2(-\frac{5}{4})^2 + 5(-\frac{5}{4}) + 3$
$= \frac{25}{8} - \frac{25}{4} + 3 = \frac{25 - 50 + 24}{8} = -\frac{1}{8}$
$(-5/4, -1/8)$

axis of symmetry: $x = -5/4$

x-intercepts: $2x^2 + 5x + 3 = 0$
$(2x + 3)(x + 1) = 0$
$x = -3/2, \quad x = -1$
$(-3/2, 0) \quad (-1, 0)$

y-intercept: $y = 2(0)^2 + 5(0) + 3$
$(0, 3)$



symmetric point: $(-\frac{5}{2}, 3)$

Problem #3

a.) zeros: $-4, 3, 5$ degree: 3

$y = (x+4)(x-3)(x-5)$
$y = (x^2 + x - 12)(x - 5)$
$y = x^3 - 5x^2 + x^2 - 5x - 12x + 60$
$y = x^3 - 4x^2 - 17x + 60$

b.) zeros: $-3, -1, 2, 5$ degree: 4

$y = (x+3)(x+1)(x-2)(x-5)$
$y = (x^2 + 4x + 3)(x^2 - 7x + 10)$
$y = x^4 - 7x^3 + 10x^2 + 4x^3 - 28x^2 + 40x + 3x^2 - 21x + 30$
$y = x^4 - 3x^3 - 15x^2 + 19x + 30$

c.) zeros: $3, 4-i$ degree = 3

$y = (x-3)(x-(4-i))(x-(4+i))$
$y = (x-3)(x-4+i)(x-4-i)$
$y = (x-3)(x^2 - 4x - ix - 4x + 16 + 4i + ix - 4i - i^2)$
$y = (x-3)(x^2 - 8x + 17)$
$y = x^3 - 8x^2 + 17x - 3x^2 + 24x - 51$
$y = x^3 - 11x^2 + 41x - 51$

d.) zeros: $1, 2, 2+i$ degree = 4

$y = (x-1)(x-2)(x-(2+i))(x-(2-i))$
$y = (x^2 - 3x + 2)(x - 2 - i)(x - 2 + i)$
$y = (x^2 - 3x + 2)(x^2 - 2x + ix - 2x + 4 - 2i - ix + 2i - i^2)$
$y = (x^2 - 3x + 2)(x^2 - 4x + 5)$
$y = x^4 - 4x^3 + 5x^2 - 3x^3 + 12x^2 - 15x + 2x^2 - 8x + 10$
$y = x^4 - 7x^3 + 19x^2 - 23x + 10$

MATH 130 EXAM #2 REVIEW KEY - SPRING 2013

Problem #4

a.) $f(x)=x^3+2x^2-3x+1 \quad g(x)=x+1$

$-1 \;|\; 1 \;\; 2 \;\; -3 \;\; 1$
$\qquad\quad -1 \;\; -1 \;\; 4$
$\qquad 1 \;\; 1 \;\; -4 \;|\; 5$

$q(x)=x^2+x-4 \quad R=5$

b.) $f(x)=-4x^3+2x^2-x+1 \quad g(x)=x+2$

$-2 \;|\; -4 \;\; 2 \;\; -1 \;\; 1$
$\qquad\quad 8 \;\; -20 \;\; 42$
$\qquad -4 \;\; 10 \;\; -21 \;|\; 43$

$q(x)=-4x^2+10x-21 \quad R=43$

c.) $f(x)=x^4+x^2+2 \quad g(x)=x-2$

$2 \;|\; 1 \;\; 0 \;\; 1 \;\; 0 \;\; 2$
$\qquad\quad 2 \;\; 4 \;\; 10 \;\; 20$
$\qquad 1 \;\; 2 \;\; 5 \;\; 10 \;|\; 22$

$q(x)=x^3+2x^2+5x+10 \quad R=22$

d.) $f(x)=x^5+1 \quad g(x)=x+1$

$-1 \;|\; 1 \;\; 0 \;\; 0 \;\; 0 \;\; 0 \;\; 1$
$\qquad\quad -1 \;\; 1 \;\; -1 \;\; 1 \;\; -1$
$\qquad 1 \;\; -1 \;\; 1 \;\; -1 \;\; 1 \;|\; 0$

$q(x)=x^4-x^3+x^2-x+1 \quad R=0$

Problem #5

a.) $f(x)=-4x^3+5x^2+8 \;;\; x+3$

$-3 \;|\; -4 \;\; 5 \;\; 0 \;\; 8$
$\qquad\quad 12 \;\; -51 \;\; 153$
$\qquad -4 \;\; 17 \;\; -51 \;|\; 161$ Not a factor

b.) $f(x)=2x^6-18x^4+x^2-9 \;;\; x+3$

$-3 \;|\; 2 \;\; 0 \;\; -18 \;\; 0 \;\; 1 \;\; 0 \;\; -9$
$\qquad\quad -6 \;\; 18 \;\; 0 \;\; 0 \;\; -3 \;\; 9$
$\qquad 2 \;\; -6 \;\; 0 \;\; 0 \;\; 1 \;\; -3 \;|\; 0$ Is a factor

c.) $f(x)=4x^4-15x^2-4 \;;\; x-2$

$2 \;|\; 4 \;\; 0 \;\; -15 \;\; 0 \;\; -4$
$\qquad\quad 8 \;\; 16 \;\; 2 \;\; 4$
$\qquad 4 \;\; 8 \;\; 1 \;\; 2 \;|\; 0$ Is a factor

Problem #6

b) $x^4-5x^3+3x^2+15x-18=0$

$p: \pm1, \pm2, \pm3, \pm6, \pm9, \pm18$
$q: \pm1$
$p/q: \pm1, \pm2, \pm3, \pm6, \pm9, \pm18$

$2 \;|\; 1 \;\; -5 \;\; 3 \;\; 15 \;\; -18$
$\qquad\quad 2 \;\; -6 \;\; -6 \;\; 18$
$\qquad 1 \;\; -3 \;\; -3 \;\; 9 \;|\; 0$

$3 \;|\; 1 \;\; -3 \;\; -3 \;\; 9$
$\qquad\quad 3 \;\; 0 \;\; -9$
$\qquad 1 \;\; 0 \;\; -3 \;|\; 0$

$(x-2)(x^3-3x^2-3x+9)$

$(x-2)(x-3)(x^2-3)=0$

$x-2=0 \quad x-3=0 \quad x^2-3=0 \quad x=2, 3, \pm\sqrt{3}$
$x=2 \quad x=3 \quad x^2=3$
$x=\pm\sqrt{3}$

c) $2x^3+3x^2+2x+3=0$

$p: \pm1, \pm3$
$q: \pm1, \pm2$
$p/q: \pm1, \pm3, \pm\frac{1}{2}, \pm\frac{3}{2}$

$-3/2 \;|\; 2 \;\; 3 \;\; 2 \;\; 3$
$\qquad\quad -3 \;\; 0 \;\; -3$
$\qquad 2 \;\; 0 \;\; 2 \;|\; 0$

$(x+\frac{3}{2})(2x^2+2)=0$

$x+\frac{3}{2}=0 \quad 2x^2+2=0$
$x=-3/2 \quad x^2=-1$
$x=\pm i$

$x=-3/2, \pm i$

d) $2x^3-11x^2+10x+8=0$

$p: \pm1, \pm2, \pm4, \pm8$
$q: \pm1, \pm2$
$p/q: \pm1, \pm2, \pm4, \pm8, \pm\frac{1}{2}$

$2 \;|\; 2 \;\; -11 \;\; 10 \;\; 8$
$\qquad\quad 4 \;\; -14 \;\; -8$
$\qquad 2 \;\; -7 \;\; -4 \;|\; 0$

$(x-2)(2x^2-7x-4)=0$
$(x-2)(2x+1)(x-4)=0$
$x=2, -1/2, 4$

Problem #6 continued

d.) $3x^3-5x^2+2x-8=0$

$p: \pm1, \pm2, \pm4, \pm8$

$q: \pm1, \pm3$

$\frac{p}{q}: \pm1, \pm2, \pm4, \pm8, \pm\frac{1}{3}, \pm\frac{2}{3}, \pm\frac{4}{3}, \pm\frac{8}{3}$

$$\begin{array}{r|rrrr} 2 & 3 & -5 & 2 & -8 \\ & & 6 & 2 & 8 \\ \hline & 3 & 1 & 4 & 0 \end{array}$$

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

$x-2=0$

$\boxed{x=2}$

$3x^2+x+4=0$

$x=\frac{-1\pm\sqrt{1^2-4(3)(4)}}{2(3)}$

$\boxed{x=\frac{-1\pm i\sqrt{47}}{6}}$

f.) $x^3-8x^2+25x-26=0$

$p: \pm1, \pm2, \pm13, \pm26$

$q: \pm1$

$\frac{p}{q}: \pm1, \pm2, \pm13, \pm26$

$$\begin{array}{r|rrrr} 2 & 1 & -8 & 25 & -26 \\ & & 2 & -12 & 26 \\ \hline & 1 & -6 & 13 & 0 \end{array}$$

$(x-2)(x^2-6x+13)=0$

$x-2=0$ $\quad x^2-6x+13=0$

$x=\frac{-(-6)\pm\sqrt{(-6)^2-4(1)(13)}}{2(1)}$

$x=\frac{6\pm4i}{2}=\frac{6}{2}\pm\frac{4i}{2}$

$\boxed{x=2 \quad x=3\pm2i}$

e.) $x^4-2x^3+10x^2-18x+9=0$

$p: \pm1, \pm3, \pm9$

$q: \pm1$

$p/q: \pm1, \pm3, \pm9$

$$\begin{array}{r|rrrrr} 1 & 1 & -2 & 10 & -18 & 9 \\ & & 1 & -1 & 9 & -9 \\ \hline & 1 & -1 & 9 & -9 & 0 \end{array}$$

$(x-1)(x^3-x^2+9x-9)$

$$\begin{array}{r|rrrr} 1 & 1 & -1 & 9 & -9 \\ & & 1 & 0 & 9 \\ \hline & 1 & 0 & 9 & 0 \end{array}$$

$(x-1)(x-1)(x^2+9)=0$

$x-1=0 \quad x-1=0 \quad x^2+9=0$

$\boxed{x=1, \pm3i}$

g) $2x^4+x^3-35x^2-113x+65=0$

$p: \pm1, \pm5, \pm13, \pm65$

$q: \pm1, \pm2$

$p/q: \pm1, \pm5, \pm13, \pm65, \pm\frac{1}{2}, \pm\frac{5}{2}, \pm\frac{13}{2}, \pm\frac{65}{2}$

$$\begin{array}{r|rrrrr} \frac{1}{2} & 2 & 1 & -35 & -113 & 65 \\ & & 1 & 1 & -17 & -65 \\ \hline & 2 & 2 & -34 & -130 & 0 \end{array}$$

$(x-1/2)(2x^3+2x^2-34x-130)=0$

$2(x-\frac{1}{2})(x^3+x^2-17x-65)=0$

$$\begin{array}{r|rrrr} 5 & 1 & 1 & -17 & -65 \\ & & 5 & 30 & 65 \\ \hline & 1 & 6 & 13 & 0 \end{array}$$

$2(x-1/2)(x-5)(x^2+6x+13)=0$

$\boxed{x=1/2, 5, 3\pm2i}$

MATH 130 EXAM #2 REVIEW KEY – SPRING 2013

Problem #7

a) $f(x) = x^3 - 2x^2 - 9x + 18$

$= (x^3 - 2x^2) - (9x - 18)$

$= x^2(x-2) - 9(x-2)$

$= (x-2)(x^2-9)$

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

x-int: $(x-2)(x+3)(x-3) = 0$

$(2,0)\ (-3,0)\ (3,0)$

y-int: $y = (0-2)(0+3)(0-3)$

$y = (-2)(3)(-3) = 18$

$(0,18)$

End behavior: $y = x^3$ ↙ ↗

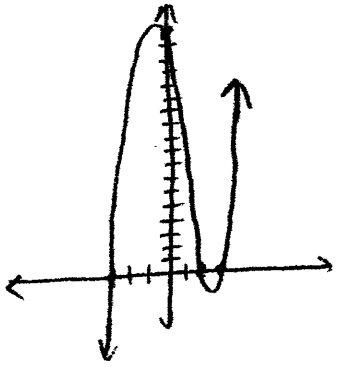
Multiplicities: $x=2$ mult 1 crosses x-axis

$x=-3$ mult 1 crosses x-axis

$x=3$ mult 1 crosses x-axis

Table of Signs:

	-3	2	3	
$x-2$	−	−	+	+
$x+3$	−	+	+	+
$x-3$	−	−	−	+
	−	+	−	+
	below x-axis	above x-axis	below x-axis	above x-axis



b) $f(x) = x^4 - 10x^2 + 9$

$(x^2-9)(x^2-1)$

$f(x) = (x+3)(x-3)(x+1)(x-1)$

x-int: $(x+3)(x-3)(x+1)(x-1) = 0$

$(-3,0)\ (3,0)\ (-1,0)\ (1,0)$

y-int: $y = (0+3)(0-3)(0+1)(0-1)$

$= (3)(-3)(1)(-1) = 9$

$(0,9)$

End behavior: $y = x^4$ ↑ ↑

Multiplicities: $x=3$ mult 1 crosses x-axis

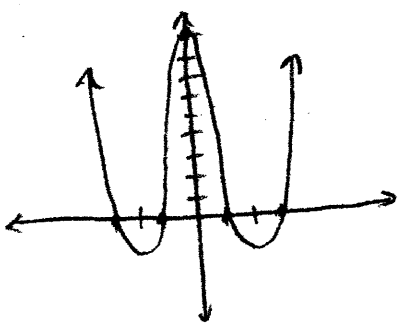
$x=-3$ mult 1 crosses x-axis

$x=1$ mult 1 crosses x-axis

$x=-1$ mult 1 crosses x-axis

Table of Signs

	-3	-1	1	3	
$x+3$	−	+	+	+	+
$x-3$	−	−	−	−	+
$x+1$	−	−	+	+	+
$x-1$	−	−	−	+	+
	+	−	+	−	+
	above x-axis	below x-axis	above x-axis	below x-axis	above x-axis



c) $f(x) = -3(x-7)(x+3)^2$

x-int: $-3(x-7)(x+3)^2 = 0$

$-3 = 0$ (x) $\quad x-7=0$, $x=7$, $(7,0)$ $\quad (x+3)^2 = 0$, $x=-3$, $(-3,0)$

y-int: $y = -3(0-7)(0+3)^2$

$y = (-3)(-7)(9) = 189$

$(0,189)$

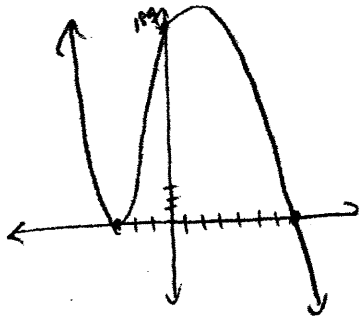
End behavior: $y = -3x^3$ ↑ ↓

Multiplicities: $x=7$ mult 1 crosses x-axis

$x=-3$ mult 2 touches x-axis

Table of Signs

	-3	7	
-3	−	−	−
$x-7$	−	−	+
$(x+3)^2$	+	+	+
	+	+	−
	above x-axis	above x-axis	below x-axis



Problem #7 continued

d.) $f(x)=(x-\frac{1}{3})^2(x-1)^3=0$

x-int: $(x-\frac{1}{3})^2(x-1)^3=0$

$(x-\frac{1}{3})^2=0 \quad (x-1)^3=0$

$x=1/3 \quad x=1$

$(\frac{1}{3},0) \quad (1,0)$

y-int: $y=(0-\frac{1}{3})^2(0-1)^3$

$y=(\frac{1}{9})(-1)=-\frac{1}{9}$

$(0,-\frac{1}{9})$

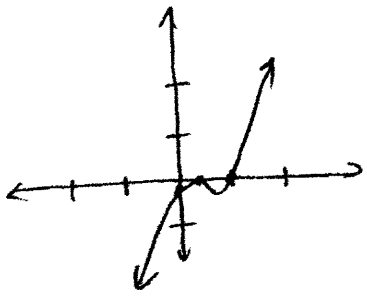
End Behavior: $y=x^5$ ↓ ↑

multiplicities: $x=\frac{1}{3}$ mult 2 touches x-axis

$x=1$ mult 3 crosses x-axis

Table of Signs:

		1/3		1	
$(x-\frac{1}{3})^2$	+		+		+
$(x-1)^3$	−		−		+
	−		−		+
	below x-axis		below x-axis		above x-axis



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

x-int: $x^2(x-3)(x+1)=0$

$x^2=0 \quad x-3=0 \quad x+1=0$

$x=0 \quad x=3 \quad x=-1$

$(0,0) \quad (3,0) \quad (-1,0)$

y-int: $y=(0)^2(0-3)(0+1)$

$y=0 \quad (0,0)$

End Behavior $y=x^4$ ↑ ↑

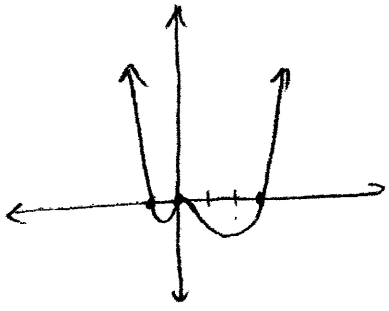
multiplicities: $x=0$ mult 2 touches x-axis

$x=3$ mult 1 crosses x-axis

$x=-1$ mult 1 crosses x-axis

Table of Signs

		−1		0		3	
x^2	+		+		+		+
$x-3$	−		−		−		+
$x+1$	−		+		+		+
	+		−		−		+
	above x-axis		below x-axis		below x-axis		above x-axis



Problem #8

a.) $f(x)=\frac{3x-2}{x^2-4x+3}=\frac{3x-2}{(x-3)(x-1)}$

x-int: $3x-2=0$

$x=2/3 \quad (2/3,0)$

y-int: $y=\frac{3(0)-2}{(0-3)(0-1)}=\frac{-2}{3} \quad (0,-2/3)$

vertical asymptote(s):

$(x-3)(x-1)=0$

$x=3, \; x=1$

horizontal asymptote:

degree numerator = 1

degree denominator = 2 $\quad y=0$

holes: none

check if graph intersects horizontal asymptote:

$\frac{3x-2}{(x-3)(x-1)}=\frac{0}{1}$

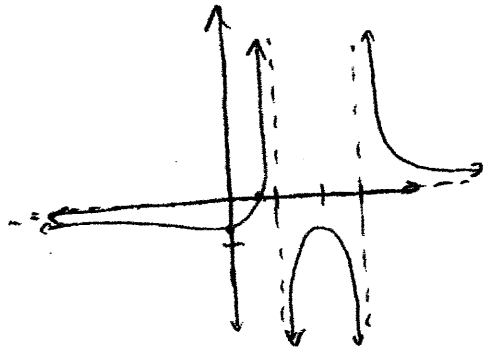
$3x-2=0$

$x=2/3$

Intersects at $x=2/3$

Table of Signs

		2/3		1		3	
$3x-2$	−		+		+		+
$x-3$	−		−		−		+
$x-1$	−		−		+		+
	−		+		−		+
	below x-axis		above x-axis		below x-axis		above x-axis



Problem #8 continued

b) $f(x) = \dfrac{3x-4}{x-3}$

x-int: $3x-4=0$
$x = 4/3$ $\quad (4/3, 0)$

y-int: $y = \dfrac{3(0)-4}{0-3} = \dfrac{4}{3}$ $\quad (0, 4/3)$

vertical asymptote(s):
$x-3=0$
$x=3$

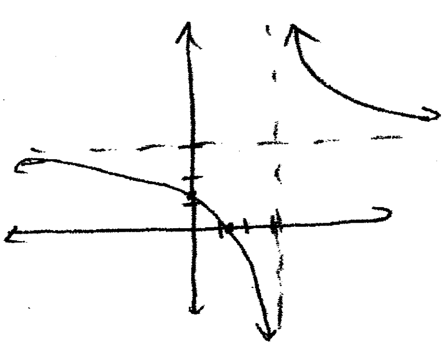
horizontal asymptote
degree numerator = 1
degree denominator = 1
$y = \frac{3}{1}$
$y = 3$

holes: none

check if graph intersects horizontal asymptote:
$\dfrac{3x-4}{x-3} = 3$
$3x-4 = 3x-9$
$-4 \neq -9$ does not intersect

Table of Signs

		4/3		3	
3x−4	−		+		+
x−3	−		−		+
	+		−		+
	above x-axis		below x-axis		above x-axis



c) $f(x) = \dfrac{x^2-3x-4}{x+2} = \dfrac{(x-4)(x+1)}{x+2}$

x-int: $(x-4)(x+1)=0$
$x = 4, -1$ $\quad (4,0)\ (-1,0)$

y-int: $y = \dfrac{(0-4)(0+1)}{0+2} = -2$ $\quad (0,-2)$

vertical asymptote(s):
$x+2=0$
$x=-2$

horizontal/oblique asymptote:
degree numerator = 2 > degree denominator = 1 $\quad$ oblique

$$\begin{array}{r} x-5 \\ x+2 \overline{) x^2-3x-4} \\ -(x^2+2x) \\ \hline -5x-4 \\ -(-5x-10) \\ \hline 6 \end{array}$$

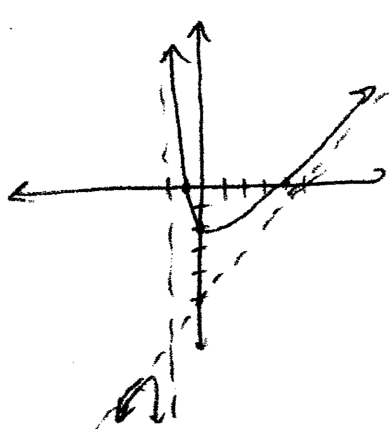
$y = x-5$

holes: none

check if graph intersects oblique asymptote:
$\dfrac{x^2-3x+4}{x+2} = x-5$
$x^2-3x+4 = x^2-3x-10$
$4 \neq -10$ does not intersect

Table of Signs

		−2		−1		4	
x−4	−		−		−		+
x+1	−		−		+		+
x+2	−		+		+		+
	−		+		−		+
	below x-axis		above x-axis		below x-axis		above x-axis



Problem #9

a.) $y = \dfrac{3x+4}{9-5x}$

degree numerator = 1
degree denominator = 1 $\quad$ (=)
$y = \dfrac{3}{-5}$

b.) $y = \dfrac{4x^2-5x+2}{2x-3}$

degree numerator = 2 > degree denominator = 1 $\quad$ oblique

$$\begin{array}{r} 2x+\frac{1}{2} \\ 2x-3 \overline{) 4x^2-5x+2} \\ -(4x^2-6x) \\ \hline x+2 \\ -(x-\frac{3}{2}) \\ \hline \frac{7}{2} \end{array}$$

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

Problem #10

a.) $y = \dfrac{3x}{x^2+5x+6}$

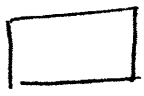
$x^2+5x+6=0$
$(x+2)(x+3)=0$
$x=-2,\ x=-3$

b) $y = \dfrac{6x}{x^3-4x^2+4x}$

$x^3-4x^2+4x=0$
$x(x^2-4x+4)=0$
$x(x-2)(x-2)=0$
$x=0,\ x=2$

MATH 130 EXAM #2 REVIEW KEY - SPRING 2013

Problem #11



$2l + 2w = 400$ ← max $A = lw$

$2l = 400 - 2w$

$l = 200 - 2w$

$A = (200 - w)w$

$A = -w^2 + 200w$ ← ∩

$w = -b/2a$

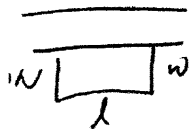
$w = \frac{-200}{2(-1)} = 100$

$l = 200 - 200 = 100$

$l = 100$ ft

$w = 100$ ft

Problem #12



$l + 2w = 4000$ ← max $A = lw$

$l = 4000 - 2w$

$A = (4000 - 2w)w$

$A = -2w^2 + 4000w$ ← ∩

$w = \frac{-b}{2a}$

$w = \frac{-4000}{2(-2)} = 1000$

$l = 4000 - 2(1000) = 2000$

$l = 2000$ m

$w = 1000$ m

Problem #13

$y = kx$

$y = 9, x = 30$

$9 = k \cdot 30$

$k = \frac{3}{10}$

$y = \frac{3}{10}x$

$y = \frac{3}{10}(40)$

$y = 12$

Problem #14

$y = \frac{k}{x}$

$y = 20, x = 1/4$

$20 = \frac{k}{1/4}$

$k = 5$

$y = \frac{5}{x}$

$y = \frac{5}{15}$

$y = 1/3$

Problem #15

$m = kzp$

$m = 10, z = 2, p = 7.5$

$10 = k(2)(7.5)$

$k = \frac{2}{3}$

$m = \frac{2}{3}zp$

$m = \frac{2}{3}(6)(9)$

$m = 36$

Problem #16

$p = \frac{kz^2}{r}$

$p = \frac{32}{5}, z = 4, r = 10$

$\frac{32}{5} = \frac{k(4)^2}{10}$

$\frac{32}{5} = k \cdot \frac{16}{10}$

$4 = k$

$p = \frac{4z^2}{r}$

$p = \frac{4(3)^2}{32}$

$p = \frac{9}{8}$

MATH 130 EXAM #2 REVIEW KEY - SPRING 2013

Problem #17

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

$y = x^5 + 2$

$x = y^5 + 2$

$x - 2 = y^5$

$\sqrt[5]{x-2} = \sqrt[5]{y^5}$

$y = \sqrt[5]{x-2}$

$f^{-1}(x) = \sqrt[5]{x-2}$

b.) $f(x) = 4x - 3$

$y = 4x - 3$

$x = 4y - 3$

$\frac{x+3}{4} = \frac{4y}{4}$

$y = \frac{x+3}{4}$

$f^{-1}(x) = \frac{x+3}{4}$

c.) $f(x) = \frac{2}{x-3}$

$y = \frac{2}{x-3}$

$x = \frac{2}{y-3}$

$x(y-3) = 2$

$xy - 3x = 2$

$\frac{xy}{x} = \frac{2+3x}{x}$

$y = \frac{2+3x}{x}$

$f^{-1}(x) = \frac{2+3x}{x}$

d.) $f(x) = \frac{1}{x}$

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

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

$xy = 1$

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

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

Problem #18 and #19 not on exam #2