Math 1470 – Fall 2014 Names: Todd, Alvin, Simon, Theodore

Ch 1-3 Review

For full credit **show all your work**. Put the writer's name in the margin next to the problem.

Todd 1) Divide $(3x+2+2x^3)\div(x-1)$ using algebraic long division.

$2x^2+2x+5+\frac{7}{x-1}$

$x-1 \enclose{longdiv}{2x^3+0x^2+3x+2}$

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

$2x^2+3x$

$-(2x^2-2x)$

$5x+2$

$-(5x-5)$

7

Alvin 2) Divide $(3x^4-5x^2+3)\div(x+2)$ using synthetic division.

-2	3	0	-5	0	3
		-6	12	-14	28
	3	-6	7	-14	31

$3x^3+-6x^2+7x-14+\frac{31}{x+2}$

Simon 3) Find, and simplify, a polynomial that has zeros of 3, 2, and 0.

$x(x-2)(x-3)$

$=x^3-5x^2+6x$

Theodore 4) Find all roots exactly for the polynomial $P(x)=x^4+2x^3-2x^2-6x=3$.

Look @ graph $x=-1,$

-1	1	2	-2	-6	-3
		-1	-1	3	3
	1	1	-3	-3	0

$\leftarrow$ graph x^3+x^2-3x-3

-1	1	1	-3	-3
		-1	0	3
	1	0	-3	0

$\leftarrow$ graph x^2-3

$\therefore$ Four roots are: $x=-1,\ x=-1,\ x=-\sqrt{3},\ x=\sqrt{3}$

Let $f(x)=\dfrac{1}{x+2}$ and $g(x)=x^2+4x+4$

Todd 5) Find $(f\circ g)(x)$.

$f(g(x))=$

$f(x^2+4x+4)=\dfrac{1}{x^2+4x+4+2}=\dfrac{1}{x^2+4x+6}$

Alvin 6) Find $f(x)\cdot g(x)$. $=\dfrac{x^2+4x+4}{x+2}$

$=\dfrac{x+2}{1}$

Simon 7) Find $\dfrac{g(x)-g(x+h)}{h}$

$=\dfrac{x^2+4x+4-[(x+h)^2+4(x+h)+4]}{h}$

$=\dfrac{x^2+4x+4-(x^2+2xh+h^2+4x+4h+4)}{h}$

$=\dfrac{(x^2-x^2)+(4x-4x)+(4-4)-h^2+-2hx+-4h}{h}$

$=\dfrac{h(-h+-2x+-4)}{h}=-h+-2x+-4$

Theodore 8) Find a line perpendicular to $y=4x+3$ and passing through the point (4, -7). Graph both and provide an equation for the new line in slope intercept form.

$m=-1/4$

$y=-1/4\,x+b$

$-7=-1/4(4)+b$

$-7=-1+b$

$-6=b$

$y=-1/4\,x+-6$

Solve the following equations:

Todd

9) $\frac{9}{9}\cdot\frac{3a-1}{a^2+4a+4}-\frac{3(a+2)}{a^2+2a(a+2)}=\frac{3}{a}\cdot\frac{a^2+4a+4}{a^2+4a+4}$

$$\frac{3a^2-9a-(3a+6)}{a(a+2)(a+2)}=\frac{3a^2+12a+12}{a^3+4a^2+4a}$$

$$3a^2-4a-6=3a^2+12a+12$$

$$-18=16a$$

$$-9/8=a$$

Alvin

10) Solve and, if possible, write your answer using both inequality notation and interval notation. $\sqrt{x^2}<3$

$$|x|<3$$

$$(-3,3)$$

$$-3<x<3$$

Simon

11) $\frac{2x^2+7x+3}{2x^2-7x-4}=1$

$$\frac{(2x+1)(x+3)}{(2x+1)(x-4)}=1$$

No solution

$$x+3=x-4$$

$$3=-4 \quad \text{NEVER...}$$

Theodore

12) $\frac{t-3}{t-3}\cdot\frac{t}{t+3}+\frac{4t}{t-3}\cdot\frac{t+3}{t+3}-\frac{18}{t^2-9}=1$

$$\frac{t^2-3t}{t^2-9}+\frac{4t^2+12t}{t^2-9}-\frac{18}{t^2-9}=\frac{t^2-9}{t^2-9}$$

$$5t^2+9t-18=t^2-9 \Rightarrow 4t^2+9t-9$$

$$t=-3 \text{ or } t=3/4$$

Todd

13) Find the center and radius of the circle given by: $x^2+y^2-4x-6y=51$

$$x^2-4x+4+y^2-6y+9=51+4+9$$

$$(x-2)^2+(y-3)^2=64$$

Center: $(2,3)$ Radius $=8=\sqrt{64}$

Alvin

14) $\frac{2}{2}\cdot\frac{6}{(y+4)}+1=\frac{5}{2y+8}$

$$\frac{12}{2y+8}+\frac{2y+8}{2y+8}=\frac{5}{2y+8}$$

$$2y+20=5$$

$$2y=-15$$

$$y=-\frac{15}{2}$$

Simon

15) $\frac{b+5}{b+5}\cdot\frac{1}{b-5}-\frac{10}{b^2-25}=\frac{1}{b+5}\cdot\frac{b-5}{b-5}$

$$b+5-10=b-5$$

$$b-5=b-5$$

$$b=b$$

$\mathbb{R}$ except $b=5$ or -5

Teddy

16) $\frac{x}{x}\cdot\frac{x-\frac{1}{x}}{1+\frac{1}{x}}=3$

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

$$3x+3=x^2-1$$

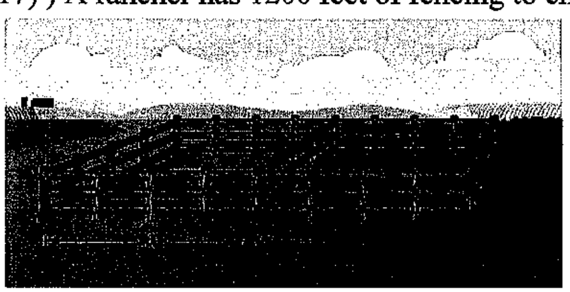
$$0=x^2-3x-4$$

$$0=(x-4)(x+1)$$

$$x=4 \text{ or } x=-1$$

Todd

17)) A rancher has 1200 feet of fencing to enclose two adjacent rectangular corrals (see figure).



$$A=2x\cdot y \qquad P=4x+3y$$

$$1200=4x+3y$$

$$1200-4x=3y$$

$$\frac{1200-4x}{3}=y$$

$$400-\tfrac{4}{3}x=y$$

$$A=2x\left(400-\tfrac{4}{3}x\right)=800x-\tfrac{8}{3}x^2$$

Write the area A of the corrals as a function of x.

$A=-\frac{8}{3}x^2+800x=-8/3\left(x^2-300x\right)=-8/3\left(x^2-300x+150^2-(150^2)\right)$

Write the area function in **standard** **form** to find analytically the dimensions that will produce the maximum area. (Use A for $f(x)$.)

$$=-8/3\left((x-150)^2-150^2\right)$$

$$=-8/3(x-150)^2+60000$$

$x=$ 150 ft. $\qquad$ $y=$ 200 ft.