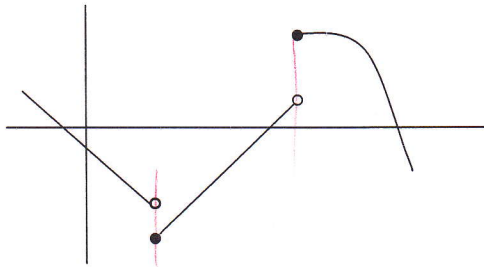


4pts 1. Graph $3x - 5y = 15$ *See graph paper*

4pts 2. If $f(x) = 4x^3 + 2x^2 + 3x$ find $f(2a)$

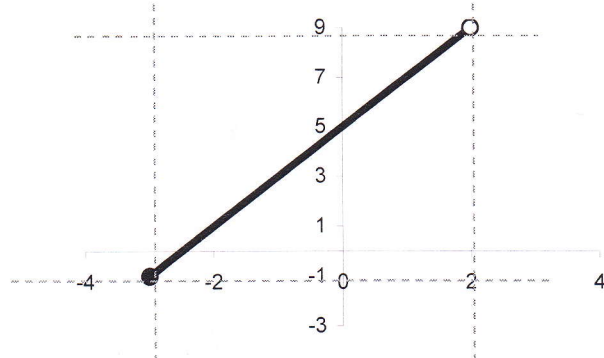
$$4(2a)^3 + 2(2a)^2 + 3(2a) = \boxed{32a^3 + 8a^2 + 6a}$$

4pts 3. Is the following a function? Why or why not?



yes it passes vertical line test

4pts 4. What is the domain and range for the function below?



*D [-3, 2]
R [-2, 9]*

4pts 5. If $f(x) = \begin{cases} 3x+5 & x < 2 \\ x^3+2 & x \geq 2 \end{cases}$ determine $f(-1)$ and $f(4)$

$$f(-1) = 3(-1) + 5 = \boxed{2}$$

$$f(4) = (4)^3 + 2 = \boxed{66}$$

*bring
of font
5.6-7*

5pts 6. Given $f(x) = x^2 - 3x + 2$ find $\frac{f(x) - f(a)}{x - a}$

$$\frac{(x^2 - 3x + 2) - (a^2 - 3a + 2)}{x - a} = \frac{(x-a)(x+a) - 3(x-a)}{x-a} = \boxed{x+a-3}$$

5pts 7. Given $f(x) = x^2 + 5x + 2$ find $\frac{f(x+h) - f(x)}{h}$

$$\frac{(x+h)^2 + 5(x+h) + 2 - [x^2 + 5x + 2]}{h} = \frac{h(2x+h+5)}{h} = \boxed{2x+h+5}$$

4pts 8. Find the equation of the line with slope 6 that passes through (5, 3)

$$y - 3 = 6(x - 5)$$

4pts 9. Find the equation of the line passing through (2, 11/3) and (8, 5/3)

$$\frac{11/3 - 5/3}{2 - 8} = \frac{6/3}{-6} = \frac{-2}{6} = -1/3$$

$$y - 11/3 = -1/3(x - 2)$$

$$y = -1/3x + 13/3$$

4pts 10. Are the lines $y = (3/2)x + 2$ and $3x - 2y = 6$ parallel, perpendicular, or neither?
Explain your answer using slopes to guide you.

$$m_1 = 3/2$$

$$\begin{aligned} 3x - 2y &= 6 \\ 2y &= 3x - 6 \\ y &= 3/2x - 3 \end{aligned} \quad m_2 = 3/2$$

$m_1 = m_2$ so lines are parallel
 $b_1 \neq b_2$

5pts 11. Graph $f(x) = (x - 1)^2 - 4$ See graph paper

5pts 12. Graph $f(x) = x^3 - 8$ See graph paper

5pts 13. Graph $f(x) = -|x + 2| + 7$ See graph paper

5pts 14. Graph $f(x) = [4x]$ See graph paper

15. Given $f(x) = 4x^4 + 5x^3 - 6x$ and $g(x) = 6x^4 - 2x^3 - 3$

4pts a) Find $(f + g)(x)$ $f(x) + g(x)$

$$10x^4 + 3x^3 - 6x - 3$$

4pts b) Find $(f \cdot g)(x)$

$$(4x^4 + 5x^3 - 6x)(6x^4 - 2x^3 - 3)$$

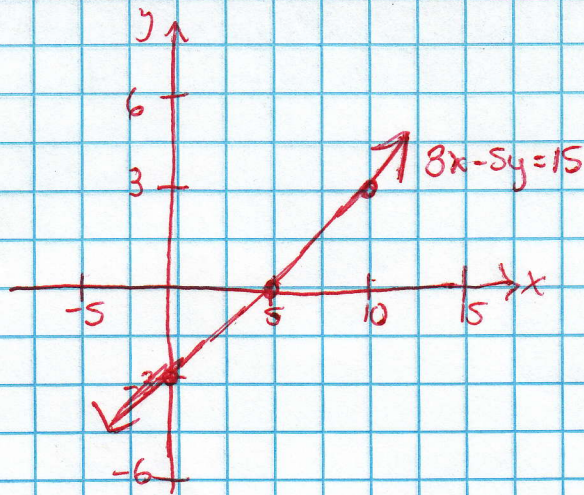
5pts c) Find $(f \circ g)(x)$

$$4(6x^4 - 2x^3 - 3)^4 + 5(6x^4 - 2x^3 - 3)^3 - 6(6x^4 - 2x^3 - 3)$$

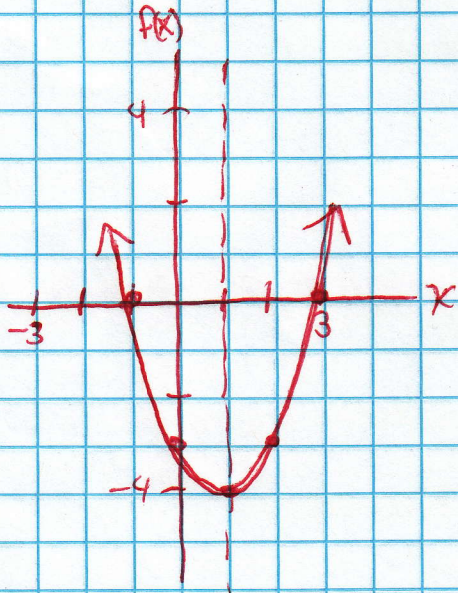
Test 2 math 115 Fall 2011

4pts (1) $3x - 5y = 15$

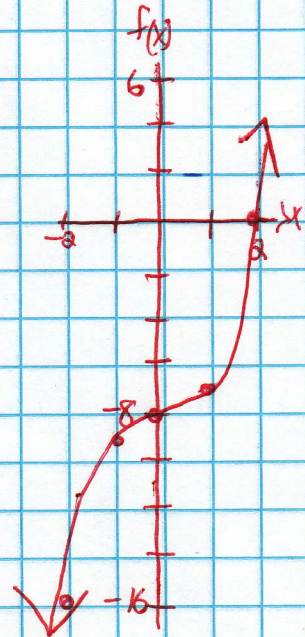
$$\begin{array}{r|l} 5 & 0 \\ 0 & -3 \\ \hline 10 & 3 \end{array}$$



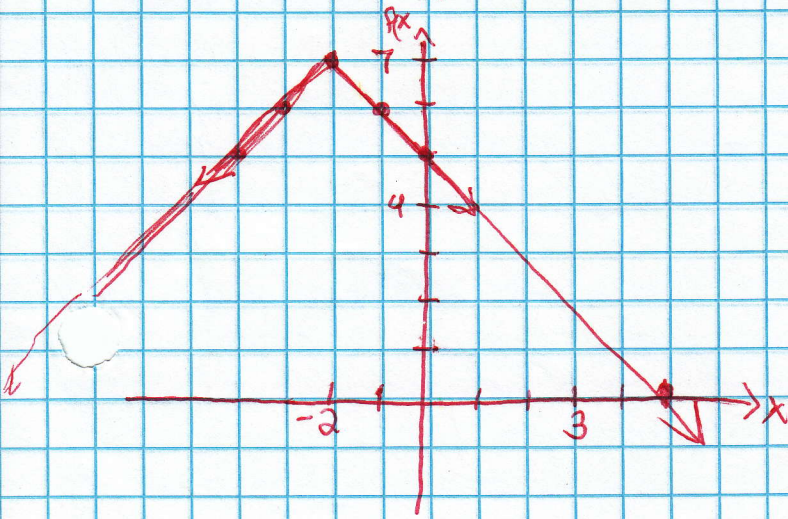
5pts (11) $y = (x-1)^2 - 4$



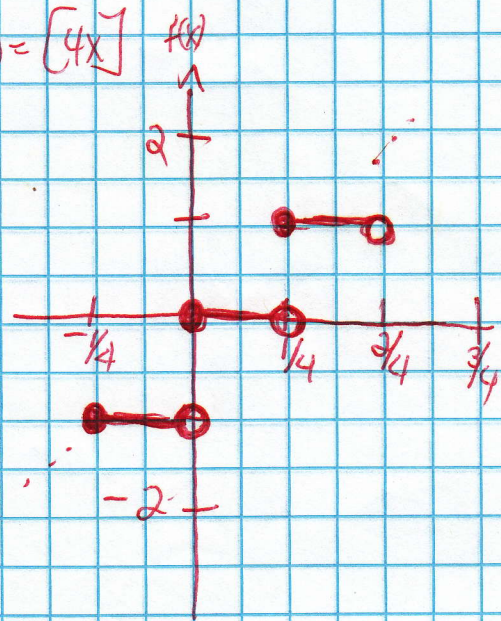
5pts (12) $f(x) = x^3 - 8$



8pts (13) $f(x) = -|x+2| + 7$



5pts (14) $f(x) = [4x]$



5pts 16. Find $f^{-1}(x)$ if $f(x) = 4x + 3$

$$\begin{aligned} y &= 4x + 3 \\ x &= 4y + 3 \\ x - 3 &= 4y \\ \frac{x-3}{4} &= y \end{aligned}$$

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

5pts 17. Find $f^{-1}(x)$ if $f(x) = (5x + 3)^3 - 2$

$$\begin{aligned} y &= (5x+3)^3 - 2 \\ x &= (5y+3)^3 - 2 \\ (x+2) &= (5y+3)^3 \\ \sqrt[3]{x+2} &= 5y+3 \end{aligned}$$

$$\begin{aligned} \sqrt[3]{x+2} - 3 &= 5y \\ \frac{1}{5}(\sqrt[3]{x+2} - 3) &= y \end{aligned}$$

$$f^{-1}(x) = \frac{1}{5}\sqrt[3]{x+2} - \frac{3}{5}$$

4pts 18. Is the graph of $f(x) = x^3 - 8$ (problem 12) one to one? Explain.

yes it is a function (VLT) that passes (HLT)
each x has 1 y and each y has 1 x value

5pts 19. Find the equation of the circle centered at the origin with a diameter of 13 units.

$$\begin{aligned} x^2 + y^2 &= \left(\frac{13}{2}\right)^2 \\ r &= 13/2 \\ x^2 + y^2 &= 169/4 \end{aligned}$$

6pts 20. Find the equation of the circle with endpoints of a diameter (6, 8) and (21, 16)

midpt Center $\left(\frac{6+21}{2}, \frac{8+16}{2}\right)$
 $\left(\frac{27}{2}, 12\right)$ $r = \frac{17}{2}$
dist $\sqrt{15^2 + 12^2}$
 $\sqrt{309} = 17$

$$\left(x - \frac{27}{2}\right)^2 + (y - 12)^2 = \frac{289}{4}$$

Some formulas you may need

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \quad \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) \quad y - y_1 = m(x - x_1)$$

$$(x - h)^2 + (y - k)^2 = r^2 \quad y = mx + b \quad m_1 = m_2$$

$$m_1 = -1/m_2 \quad 2r = d$$