

Name: \_\_\_\_\_

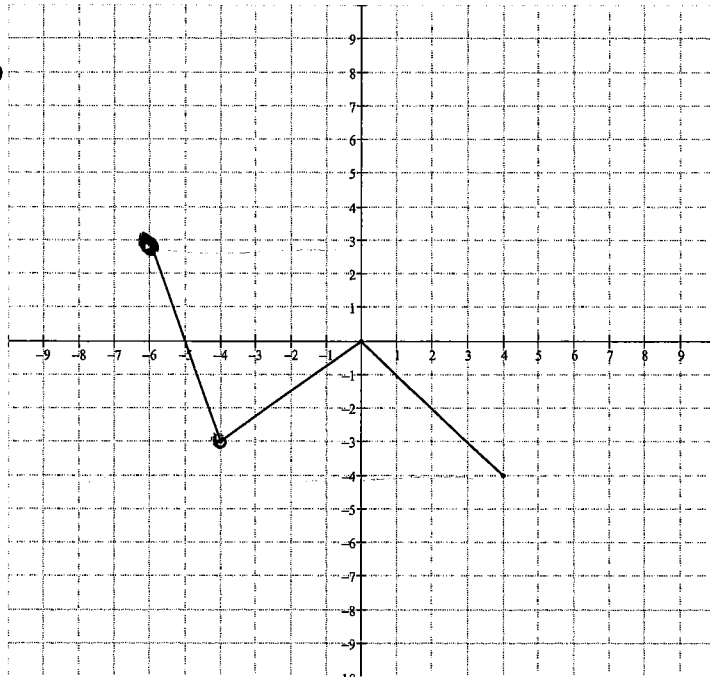
*Key*

Final Exam Review (Written Practice)

1. The graph of  $y = f(x)$  is shown below.

old points  

$$\begin{array}{r|l} -6 & 3 \\ -4 & -3 \\ 0 & 0 \\ 4 & -4 \end{array}$$

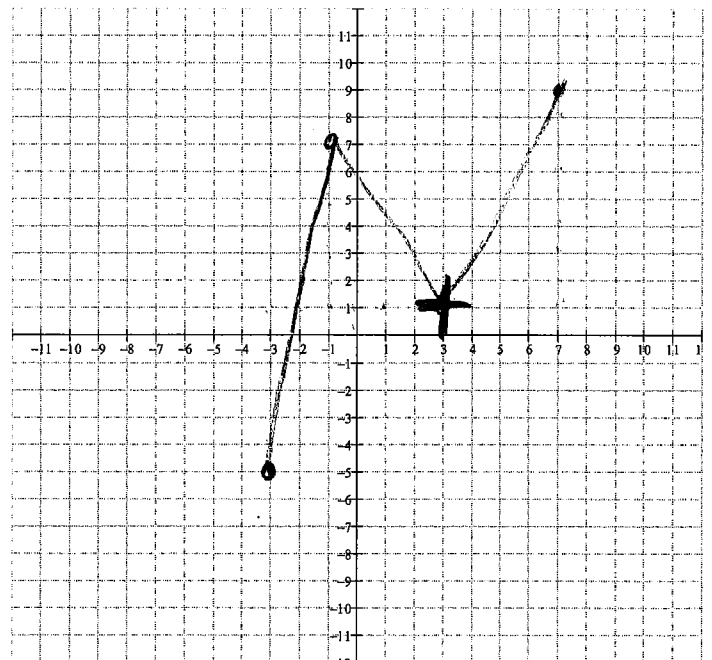
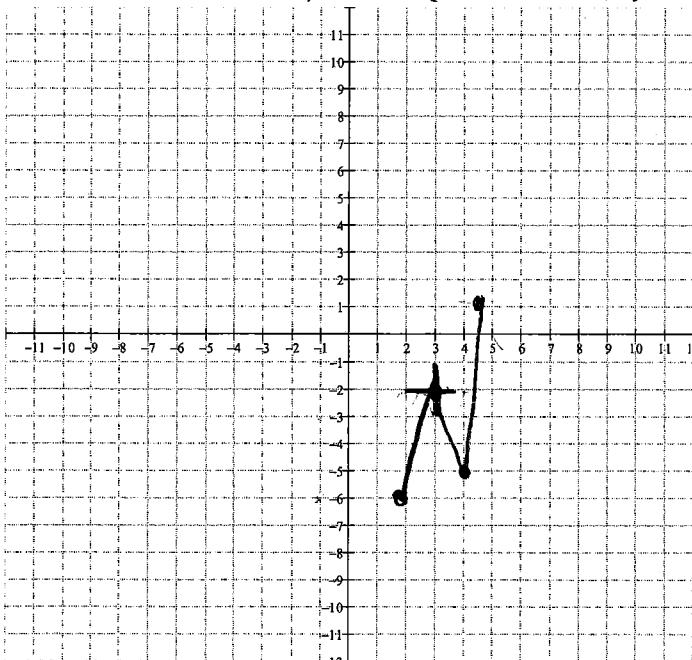


$y = -2(x-3) + 1$

a) Sketch the graph of  $y+2 = f(-4x+12)$

$y = f(-4(x-3)) - 2$

b) Sketch the graph of  $y-1 = -2f(x-3)$



$b = -4$   
 divide  
 x's by  
 (-4)

$$\begin{array}{r|l} 3 & -6 \\ 2 & -4 \\ 1 & -4 \\ 0 & 0 \\ -7 & -4 \end{array}$$

$a = -2$   
 Mult  
 y's by  
 (-2)

$$\begin{array}{r|l} -6 & -6 \\ -4 & 6 \\ 0 & 0 \\ 4 & -8 \end{array}$$

2. Solve the following equations algebraically.

a)  $\log_6(x-3) + \log_6(x+6) = 2$

$$\log_6(x-3)(x+6) = \log_6 6^2$$

$$(x-3)(x+6) = 36$$

$$x^2 + 6x - 3x - 18 = 36$$

$$x^2 + 3x - 54 = 0$$

$$(x+9)(x-6) = 0$$

$$x = -9 \quad x = 6$$

$$\begin{array}{r} x-3 > 0 \\ x > 3 \end{array}$$

$$\begin{array}{r} x+6 > 0 \\ x > -6 \end{array}$$

b)  $3^{2x} = 7^{x+1}$

$$\log 3^{2x} = \log 7^{x+1}$$

$$2x \log 3 = (x+1) \log 7$$

$$2x \log 3 = x \log 7 + \log 7$$

$$2x \log 3 - x \log 7 = \log 7$$

$$x(2 \log 3 - \log 7) = \log 7$$

$$x = \frac{\log 7}{2 \log 3 - \log 7}$$

$$x = 7.74$$

3. For the function  $f(x) = \frac{x^2 + 12x + 32}{x^2 + 10x + 16}$  determine the following, if they exist:

$x$ -intercept  $(-4, 0)$

$$\frac{(x+8)(x+4)}{(x+8)(x+2)} = \frac{x+4}{x+2}$$

$y$ -intercept  $(0, 2)$

$$y = \frac{0+4}{0+2}$$

Vertical asymptote  $x = -2$

Point of discontinuity  $(-8, \frac{2}{3})$

$$y = \frac{-8+4}{-8+2} = \frac{-4}{-6}$$

4. Rewrite  $y = \frac{-5x-1}{x+2}$  in the form  $y = \frac{a}{x-k} + h$

$$x+2 \overline{\begin{array}{r} -5 \\ -5x-1 \\ -5x-10 \\ \hline 9 \end{array}}$$

$$y = \frac{9}{x+2} - 5$$

5. Given  $f(x) = 2x^2 + 5$  and  $g(x) = \sqrt{x-2}$  determine the value of

a)  $f(g(6))$

$$\begin{aligned} g(6) &= \sqrt{6-2} \\ &= \sqrt{4} \\ &= 2 \end{aligned}$$

$$\begin{aligned} f(2) &= 2(2)^2 + 5 \\ &= 8 + 5 \\ &= 13 \end{aligned}$$

b)  $g(f(-1))$

$$\begin{aligned} f(-1) &= 2(-1)^2 + 5 \\ &= 2 + 5 \\ &= 7 \end{aligned}$$

$$\begin{aligned} g(7) &= \sqrt{7-2} \\ &= \sqrt{5} \end{aligned}$$

6. Prove the identity.

|          |   |
|----------|---|
| $\sec x$ | $\frac{2 \csc 2x \tan x}{\sec x}$                                     |
|          | $\frac{2 \tan x}{\sin 2x \sec x}$                                     |
|          | <del><math>\frac{2 \tan x \cdot \cos x}{2 \sin x \cos x}</math></del> |
|          | $\frac{\tan x}{\sin x}$   |
|          | $\frac{\frac{\sin x}{\cos x}}{\sin x}$                                |
|          | <del><math>\frac{\sin x}{\cos x} \cdot \frac{1}{\sin x}</math></del>  |
|          | $\frac{1}{\cos x}$  |
|          | $\sec x$  |