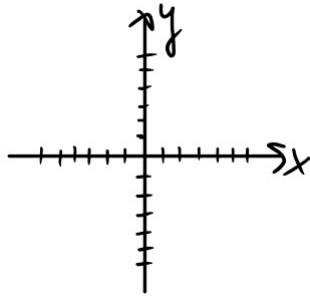


Math 90 Final. Show all work for credit. Name

1.) Find the domain of  
 $g(x) = \sqrt[4]{x^2 + 3x}$

2.) Sketch the graph of the piecewise defined function:

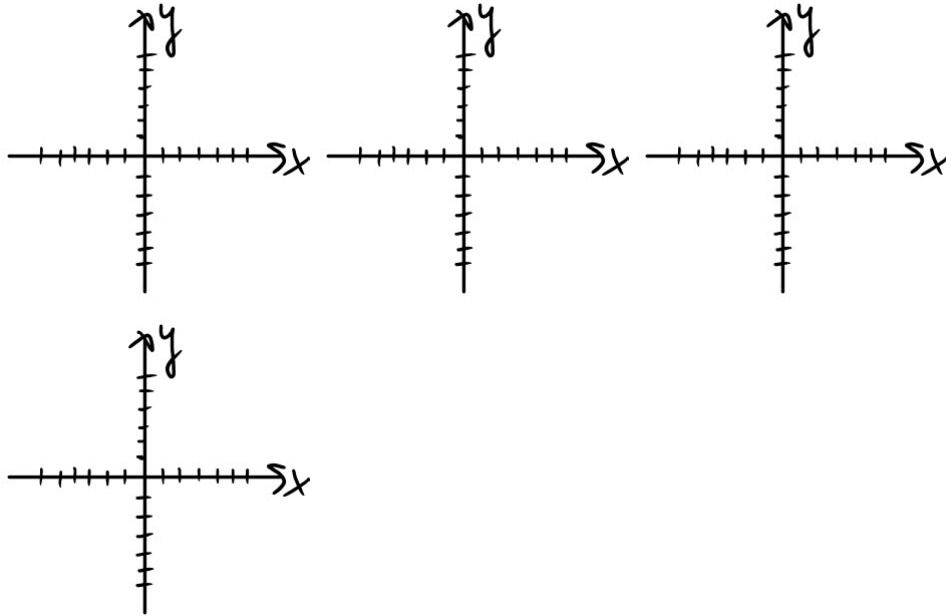
$$f(x) = \begin{cases} x + 1, & x \leq -1 \\ 2, & x > -1 \end{cases}$$



3.) Find the difference quotient  $\frac{f(a+h) - f(a)}{h}$  where  $h \neq 0$  of  
 $f(x) = 3x^2 - 2x + 1$

4.) Sketch the graph, not by plotting points, but by starting with a standard function and applying transformations.

$$y = 3 - \sqrt{x - 1}$$



5.) Find  $f \circ g$  and  $g \circ f$ , and their domains.

$$f(x) = \sqrt{x - 4}, g(x) = x^2$$

6.) Find  $f/g$  and its domain.

$$f(x) = \frac{3}{x}, g(x) = \frac{x-2}{x}$$

7.) Test for symmetry (even, odd, or neither). Show all work for credit.

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

8.) Find the zeros of P and then write the polynomial in factored form.

$$P(x) = x^3 - 8x^2 + 5x + 14$$

9.) Find all horizontal and vertical asymptotes of  $f(x) = \frac{4x - 5}{x^2 - 4}$

10.) Solve. Write the exact solution in terms of logarithms.  
 $e^{1+2x} = 4$

11.) Solve using matrices and Gaussian elimination:  
 $x + y + z = -3$   
 $-x + 3y + 2z = -8$   
 $2x + z = -3$

12.) Use the laws of logarithms to combine:

$$2\log x + \frac{1}{2}\log(x^2 + 1)$$

13.) Find an equation for the ellipse that satisfies:

$$\text{eccentricity} = \frac{1}{3} \text{ and foci}(0, \pm 2)$$

14.) Extra Credit: Find the  $n$ th term of the sequence whose first several terms are given by  $\frac{2}{1}, \frac{5}{4}, \frac{8}{9}, \frac{11}{16}, \dots$

