Exam 1 Key

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

Dan f: 242 Don f: 11 #1
Ronge f: 27 #1 Rought: 4 #2

1. Find the inverse of the function  $f(x) = \frac{x+3}{x-2}$ , and give the domain and range of f and  $f^{-1}$ . (12 pts.)

$$\mathcal{H} = \frac{4+3}{4-2}$$

$$\mathcal{K}(y-z) = y+3$$

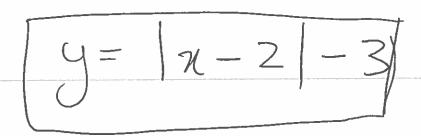
$$24-2x=4+3$$

$$24-4=2x+3$$

 $Q = \frac{7x+3}{\chi-1}$ 2. Let  $f(x) = \sqrt{x-4}$  and g(x) = 2-3x. Find  $(f \circ g)(x)$  and also find the domain of  $(f \circ g)(x)$ . (12 pts.)

$$fog(x) = f(g(x)) = f(z-3x) = \sqrt{z-3x-4}$$
  
 $fog(x) = \sqrt{-z-3x}$ 

Domain of fog  $-2-3x \ge 0$  +  $50 -3x \ge 2$  3. Write an equation for a function whose graph fits the description given as follows. The graph of f(x) = |x| is shifted 2 units right, and shifted 3 units down. (8 pts.)



4. Let  $f(x) = 3x^2 - 2x$ . Find f(-3) and f(2) and find the average rate of change as x changes from -3 to 2. (12 pts.)

$$f(-3) = 3(-3)^2 - 2(-3) = 27 + 6 = 33$$
  
 $f(z) = 3(z)^2 - 2(z) = 12 - 4 = 8$ 

Aug 
$$R_{6}C = \frac{f(-3) - f(z)}{-3 - z} = \frac{33 - 8}{-5} = \frac{-25}{-5} = \boxed{5}$$
Over 
$$(-3,2)$$
Find an equation of the vertical line through the point (2,6). (8 pts.)

5. Find an equation of the vertical line through the point (2,6).

6. It costs \$15 flat fee to rent a lawnmower, plus \$3 an hour starting with the first hour. Let x represent the number of hours rented, so y represents the charge to the user. Write an equation of the form y = mx + b that represents the situation. If the user was charged \$24, then how many hours did they rent the mower? (8 pts.)

$$U = 15 + 3x$$
  
 $24 = 15 + 3x$   
 $9 = 3x$   
 $x = 3$  So  $3 \text{ hours}$ 

7. Write an equation of the line containing the given point and parallel to the given line.  $(2,-3); \quad 2x-3y=4$ (10 pts.)

$$2\pi - 34 = 4$$

$$= 34 = 4 - 2x$$

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

8. Simplify the expression  $\frac{\frac{2}{x+h} - \frac{2}{x}}{h}$ .

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

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

$$y = \frac{2}{3}x - \frac{4}{3} - 3 = \frac{4}{3}x - \frac{13}{3}$$
(12 pts.)

$$\left(\frac{2}{\chi+h} - \frac{2}{\chi}\right) \frac{1}{h}$$

$$= \left(\frac{2\chi - 2(\chi+h)}{\chi(\chi+h)}\right) \frac{1}{h}$$

$$= \frac{2\chi - 2\chi - 2h}{\chi(\chi+h)}$$

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9. What is the center and radius of a circle with endpoints of a diameter at the points (3,5) and (-1,1)? (12 pts.)

$$\frac{d \text{ fameter}}{d} = \sqrt{(3-(-1)^2+(5-15)^2)^2}$$

$$= \sqrt{4^2+4^2} = \sqrt{32} = 4\sqrt{2}$$

Center midpoint 
$$n = 3 + (-1) = 1$$
 centrate
$$4 = 5 + 1 = 3$$
Simplify the expression  $(-8)^{1/3}$ 

$$(6 pts)$$

10. Simplify the expression  $(-8)^{1/3}$ .

$$(-8)^{1/3} = [-2]$$