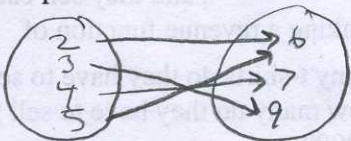


Exam Review

Functions

1. $\{(2,6), (4,7), (5,6), (3,9)\}$

a) Is this relation a function? Show arrow diagram and explain.



yes.
x's don't repeat.

b) Is this relation a one-to-one function? Fully explain.

NO, two arrows to 6. 6 repeats as a y. Inverse is NOT a function.

2. $f(x) = x^2 + 2x + 1$

a) Find $f(-3)$

$$(-3)^2 + 2(-3) + 1 = 9 - 6 + 1 = 4$$

b) Find $f(x+2)$

$$(x+2)^2 + 2(x+2) + 1 = x^2 + 2x + 2x + 4 + 2x + 4 + 1 = x^2 + 6x + 9$$

3. $f(x) = 3x + 2$ $g(x) = x^2 + 4$

a) Find $f(g(-2))$

$$g(-2) = (-2)^2 + 4 = 4 + 4 = 8$$

$$f(8) = 3(8) + 2 = 26$$

b) $f(x) \cdot g(x)$

$$(3x+2)(x^2+4) = 3x^2 + 2x^2 + 12x + 8$$

c) $(g \circ f)(x)$

$$f(x) = 3x + 2$$

$$g(3x+2) = (3x+2)^2 + 4 = 9x^2 + 6x + 6x + 4 + 4$$

$$9x^2 + 12x + 8$$

Name: Answers Section:

4. Which relations are functions (circle all that are)

(a) $x = |y|$ (b) $x + y^2 = 5$ (c) $(3,3), (3,-3)$ repeat

(c) $x = 5y$ (d) $10 = y - \sqrt{x}$ (b) $(1,2), (1,-2)$ repeat

(c) $(5,1)$ no repeat (d) $(4,12)$ no repeat
 $y = \frac{x}{5}$ ← function $y = 10 + \sqrt{x}$ ← function.

5. Find the limited:

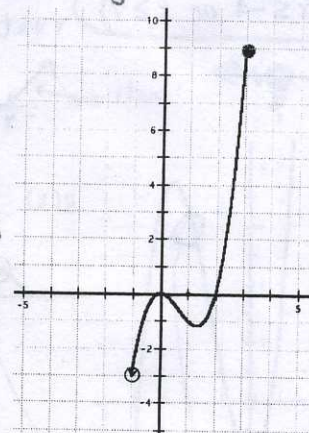
a) Domain
 smallest $x = -1$
 biggest: 3

$$[-1, 3]$$

b) Range

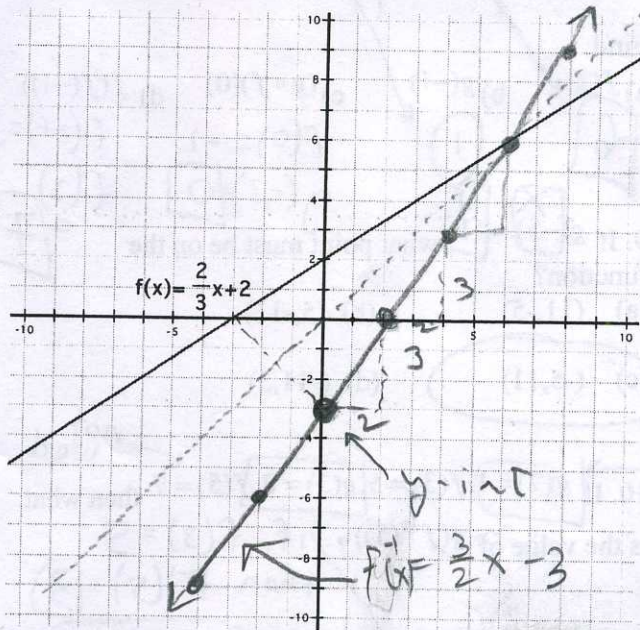
smallest $y = -3$
 biggest = 9

$$[-3, 9]$$



6. Graph the inverse of the following function.

Label the inverse in slope-intercept form ($mx+b$).



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

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

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

slope y-int

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

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

7. What is the domain of the following function?

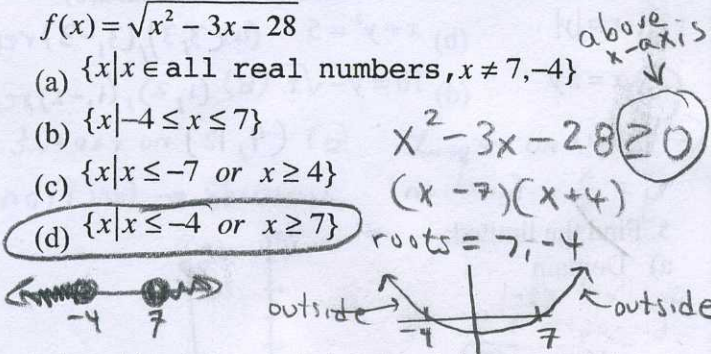
$$f(x) = \sqrt{x^2 - 3x - 28}$$

(a) $\{x | x \in \text{all real numbers}, x \neq 7, -4\}$

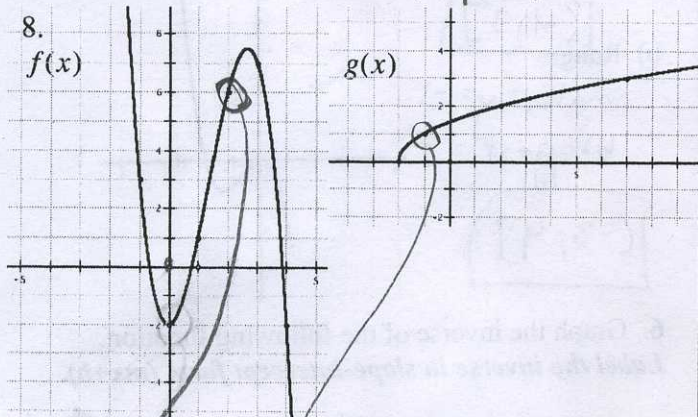
(b) $\{x | -4 \leq x \leq 7\}$

(c) $\{x | x \leq -7 \text{ or } x \geq 4\}$

(d) $\{x | x \leq -4 \text{ or } x \geq 7\}$



8.



Find:

a) $f(2)$

6

b) $g(-1)$

1

c) $(g \circ f)(0)$

$f(0) = -2$
 $g(-2) = 0$

d) $f(f(-1))$

$f(-1) = 3$
 $f(3) = 7$

9. If $g(-5) = 11$, what point must be on the function?

(a) (11, -5)

(b) (5, -11)

(c) (-5, 11)

(d) (-11, 5)

10. If $g(7) = 1, f(3) = 5, g(3) = 8, f(5) = 7$ then what is the value of $g(f^{-1}(5))$?

Handwritten work:

if $f(3) = 5$ then $f^{-1}(5) = 3$

$g(3) = 8$

11. Find the domain of the following function.

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

denominator not zero.

$$x + 8 \neq 0$$

$$x \neq -8$$

domain = $\{x | x \in \text{real numbers}, x \neq -8\}$

12. MVA is hosting a T-Shirt sale to raise money for a fundraiser. The cost function of producing the T-Shirts is $C(x) = 3x + 220$, and they sell each T-Shirt for \$5.00 making a revenue function of $R(x) = 5x$. How many t-shirts do they have to sell to break even? How many do they have to sell to make a profit of \$1000?

$$P(x) = R(x) - C(x)$$

$$= 5x - (3x + 220)$$

$$= 5x - 3x - 220 = 2x - 220$$

Break even:

$$2x - 220 = 0$$

$$x = 110$$

Profit:

$$2x - 220 = 1000$$

$$x = 610$$

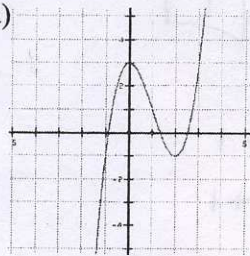
13. Which are functions: (a) (b) (c) (d)

Which are 1-1 functions: (a) (b) (c) (d)

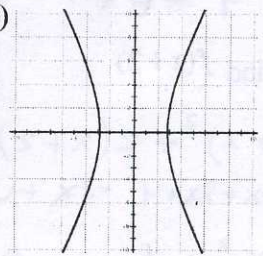
Which are onto functions: (a) (b) (c) (d)

↑ not a function

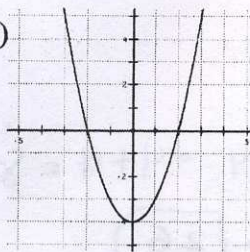
(a)



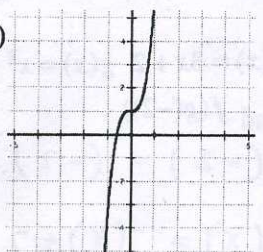
(b)



(c)



(d)



14. $f(x) = 2x + 4$, find $f^{-1}(x)$ then find $f(f^{-1}(x))$

$$y = 2x + 4$$

$$x = \frac{y-4}{2}$$

$$\left(\frac{1}{2}\right)(x-4) = \left(\frac{1}{2}\right)(y-4)$$

$$\frac{1}{2}x - 2 = y$$

$$f^{-1}(x) = \frac{1}{2}x - 2$$

$$f\left(\frac{1}{2}x - 2\right) = 2\left(\frac{1}{2}x - 2\right) + 4$$

$$= x - 4 + 4 = x$$