Unit 1 Test Prep

Find the domain and range for this problem. (Use your calculator)

1. $f(x) = x - 3$

Domain: $\mathbb{R}$ or $(-\infty, \infty)$

Range: $\mathbb{R}$ or $(-\infty, \infty)$

Use the given f(x) and g(x) to evaluate each expression

2. $f(x) = 2x + 1$ $\quad g(x) = -4x - 1$

a. $(f \times g)(x)$

$f(g(x))$

$2(x) + 1$

$2(-4x - 1) + 1$

$-8x - 2 + 1$

$\boxed{-8x - 1}$

b. $(g(g(x))$

$-4(-4x - 1) - 1$

$16x + 4 - 1$

$\boxed{16x + 3}$

$g(f(3))$

$2(3) + 1$

$6 + 1 = 7$

$-4(7) - 1$

$-28 - 1 = \boxed{-29}$

Find the inverse function.

3. $f(x) = \sqrt[3]{5x + 7}$

do	undo
$\sqrt[3]{}$	-7
$*5$	$\div 5$
$+7$	$\wedge 3$

$(x) = \sqrt[3]{5y + 7}$

$x^3 = 5y + 7$

$-7 \quad -7$

$\frac{x^3 - 7}{5} = \frac{5y}{5}$

$f^{-1} = \frac{x^3 - 7}{5}$

4. $f(x) = \frac{x-6}{3}$

do	undo
-6	$*3$
$\div 3$	$+6$

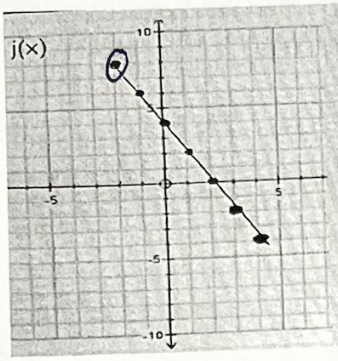
$3(x) = \left(\frac{y-6}{3}\right)3$

$3x = y - 6$

$+6 \quad +6$

$3x + 6$

$f^{-1} = 3x + 6$



x	g(x)
-3	2
-2	4
-1	7
0	-4
1	-1
2	2
3	0

$h(x) = 3x + 5$

$14 = 3x + 5$

$-5 \quad -5$

$\frac{9}{3} = \frac{3x}{3}$

$3 = x$

Use the functions above to answer the following questions.

1. $J(-2) = 8$

6. $H(x) = 14$, $x = 3$

7. $G(x) = 2$, $x = -3, 2$

$x = -3, 2$

Tables for the function f and g are given. Evaluate the expression.

x	1	2	3	4
f(x)	4	3	1	2

x	1	2	3	4
g(x)	2	3	4	5

8. $(g \times f)(1)$

$g(f(1))$

$g(4) = 4$

5

9. $(f \times f)(3)$

$f(f(3))$

$f(1) = 1$

4

$g(f(x)) = \#$

Use elimination, substitution, or matrix operations and then backwards substitution to solve the system of equations. Write solution as an ordered pair.

$\begin{bmatrix} 1 & \# & \# \\ 0 & 1 & \# \end{bmatrix}$

10. $x - 3y = -2$ $\quad -2$

$2x - y = -4$

$(-2, 0)$

$-2x + 6y = 4$

$+ 2x - y = -4$

$\frac{5y}{5} = \frac{0}{5}$

$y = 0$

$2x - 0 = -4$

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

$x = -2$

Solve the following problems with your calculator. Put answer as an ordered triple.

11. $x - z = -3$

$y - z = -2$

$2x + y = -5$

x - y - z

$(-2, -1, 1)$

$$\begin{bmatrix} 1 & 0 & -1 & -3 \\ 0 & 1 & -1 & -2 \\ 2 & 1 & 0 & -5 \end{bmatrix} \text{ rref } \begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$

12. $x + 3y + z = 6$

$3x + y - z = 6$

$x - y - z = 0$

$\begin{bmatrix} 1 & 0 & 0 & \# \\ 0 & 1 & \# & \# \\ 0 & 0 & 0 & \# \end{bmatrix}$ - No Solution

$$\begin{bmatrix} 1 & 3 & 1 & 6 \\ 3 & 1 & -1 & 6 \\ 1 & -1 & -1 & 0 \end{bmatrix} \text{ rref } \begin{bmatrix} 1 & 0 & -0.5 & 1.5 \\ 0 & 1 & 0.5 & 1.5 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Infinite Solutions

$f(x) = 4x - 7$

13. Find the net change (f(b) – f(a) when b > a where x = -3 and x = 5

$4(-3) - 7$

$-12 - 7 = -19$

$4(5) - 7$

$20 - 7 = 13$

$13 - (-19)$

$13 + 19 = 32$

14. Using the piecewise function to answer the following questions.

$$f(z) = \begin{cases} z & \text{if } x < -1 \\ z + 1^2 & \text{if } -1 \leq z \leq 2 \end{cases}$$

a) Find f(2), and f(-4)

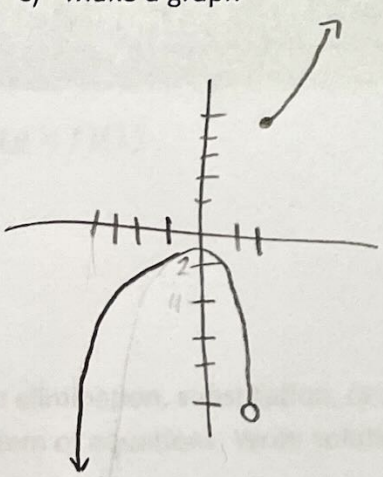
$=3$ $=-3$

b) Determine the domain and range

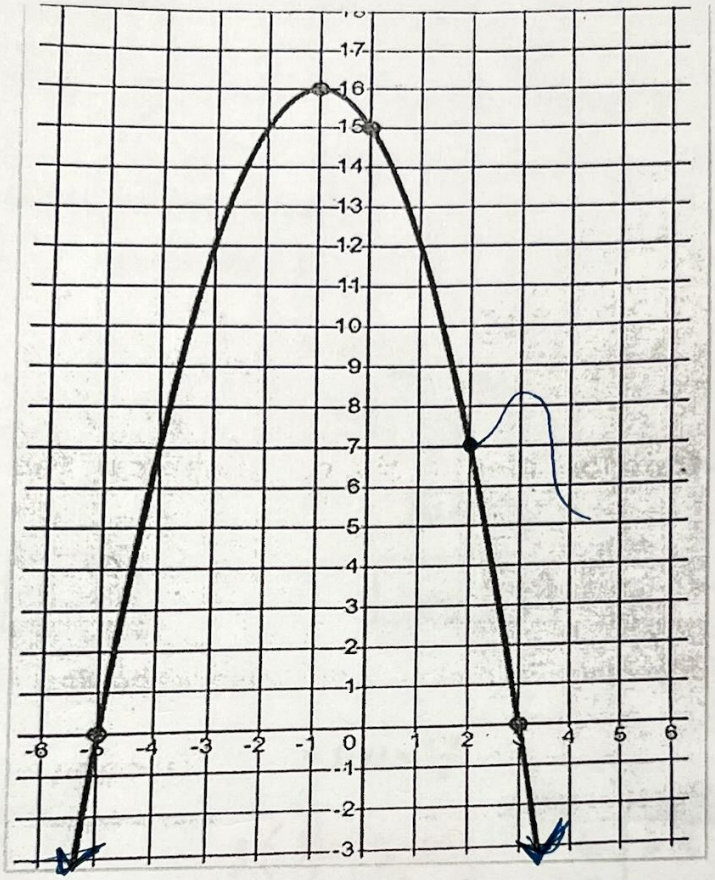
$[2, \infty)$

$(-\infty, 2)$

c) Make a graph



15. Use the graph to answer the following questions.



Use x value (

Interval where f(x) is increasing: $[-\infty, -1]$, $(-\infty, -1)$

Interval where f(x) is decreasing: $[-1, \infty)$ or $(-1, \infty)$

What is the local maximum(s):

$(-1, 16)$ or 16

What is the local minimum(s):

None