Name: Key **Show work needed to justify your answer.** Date: _____

Exam: # 1: Math IBSL - Chapter 2: Functions

50 points

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1 Decide whether the following relations are functions or not. Explain your answer.

(4 points each)

a

x	−9	−5	0	1	3	5
y	−8	−6	−9	−1	0	5

Function
x Does not Repeat

b

x	−11	−1	−1	11
y	5	7	0	8

Not a function
-1 and -1 in Domain
Repeat.

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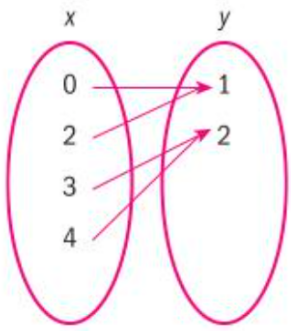
2 State the domain and range for the functions below:

(4 points each)

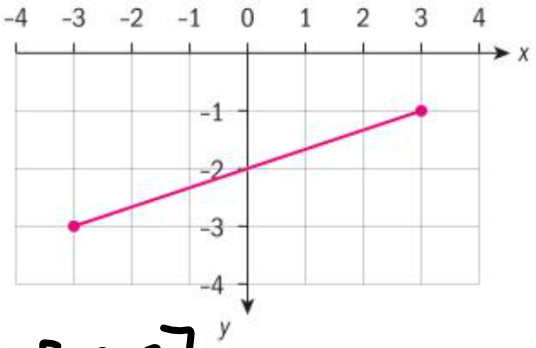
a.



D: {0,2,3,4}

R: {1,2}

b.



D: [-3,3]

R: [-3,-1]

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3 Use the functions $f(x) = x^2 - 6$, $g(x) = -2x$ and $h(x) = -4$ to evaluate:

(4 points each)

a. $f(1) + h(2)$

$(1)^2 - 6 + (-4)$

$1 - 6 - 4$

$\boxed{-9}$

b. $g^{-1}(-3)$

$y = -2x$

$x = -2y$

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

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

$\boxed{g^{-1}(-3) = \frac{3}{2}}$

or $-3 = -2x$

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

$\boxed{g^{-1}(-3) = \frac{3}{2}}$

c. $f(g(x))$

$f(-2x)$

$(-2x)^2 - 6$

$\boxed{f(g(x)) = 4x^2 - 6}$

Name: _____ **Show work needed to justify your answer.** Date: _____

Exam: # 1: Math IBSL - Standards 44 - 47 - Trigonometry

50 points

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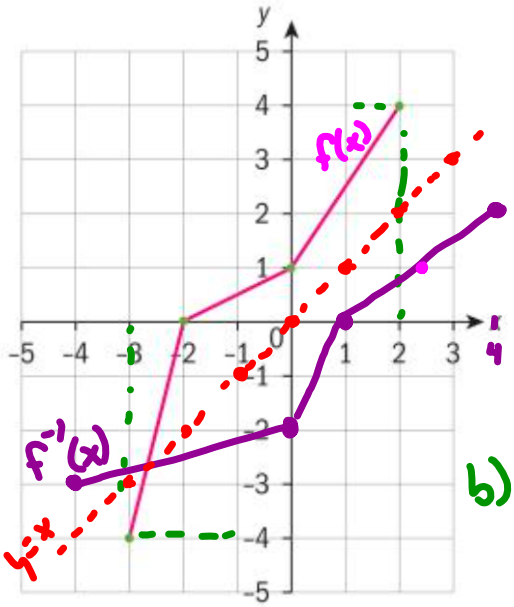
4. The graph below shows $y = f(x)$ for $-3 \le x \le 2$. (4 points)



a i Write down the value of $f(-3)$.

ii Write down the value of $f(2)$.

b Find the domain of f^{-1}.

c Sketch the graph of f^{-1}.

a(i) $f(-3) = -4$

(ii) $f(2) = 4$

b) D: $[-4, 4]$ for $f^{-1}(x)$

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5. Let $f(x) = 2\sqrt{x} + x^2$. Let h be a function such that $h(16) = -2$. Find $(f \circ h^{-1})(-2)$. (5 points)

$f(h^{-1}(-2)) = f(16) = 2\sqrt{16} + 16^2$

$= 8 + 256$

$f(h^{-1}(-2)) = 264$

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6. Given $f(x) = -2x + 5$ and $g(x) = 4x - 1$: (4 points each)

a find an expression for $f(g(x))$

b solve $f(g(x)) = 12$.

(a) $f(g(x)) = f(4x-1)$

$= -2(4x-1) + 5$

$= -8x + 2 + 5$

$f(g(x)) = -8x + 7$

(b) $-8x + 7 = 12$

$-8x = 5$

$x = \frac{-5}{8}$

Formula page: