Student: _____ **Date:** _____	**Instructor:** Andreas Lazari **Course:** Math1111-Summer2018	**Assignment:** Section 2.7 Homework

1. Find f(g(x)) and g(f(x)) and determine whether the pair of functions f and g are inverses of each other.

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

if $f(g(x)) = x$ and $g(f(x)) = x$ then f and g are inverses of each other

$f(g(x)) =$ X

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

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

$g(f(x)) =$ X

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

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

- (●) f and g are inverses of each other.
- ( ) f and g are not inverses of each other.

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2. Find f(g(x)) and g(f(x)) and determine whether the pair of functions f and g are inverses of each other.

$f(x) = 2x - 7$ and $g(x) = \frac{x+2}{7}$

$f(g(x)) = 2\left(\frac{x+2}{7}\right) - 7 = \frac{2x+4}{7} - \frac{49}{7} = \frac{2x+4-49}{7} = \frac{2x-45}{7}$

a. $f(g(x)) =$ $\frac{2x-45}{7}$

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

b. $g(f(x)) =$ $\frac{2x-5}{7}$

$g(f(x)) = \frac{2x-7+2}{7} = \frac{2x-5}{7}$

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

c.
- (●) f and g are not inverses of each other.
- ( ) f and g are inverses of each other.

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3. The function $f(x) = 8x + 2$ is one-to-one.

$y = 8x + 2 \Rightarrow$ 1. interchange x and y.
2. solve for y.
3. replace y with $f^{-1}(x)$.

Find an equation for $f^{-1}(x)$, the inverse function.

$f^{-1}(x) =$ $\frac{x-2}{8}$

(Type an expression for the inverse. Use integers or fractions for any numbers in the expression.)

$\Rightarrow x = 8y + 2$
$\Rightarrow 8y = x - 2$
$\Rightarrow y = \frac{x-2}{8}$
$f^{-1}(x) = \frac{x-2}{8}$

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4. The function $f(x) = x^3 - 6$ is one-to-one.

$y = x^3 - 6$

Find an equation for $f^{-1}(x)$, the inverse function.

$\Rightarrow x = y^3 - 6 \Rightarrow y^3 = x + 6$
$\Rightarrow y = (x+6)^{1/3}$
$\Rightarrow y = \sqrt[3]{x+6} \Rightarrow f^{-1}(x) = \sqrt[3]{x+6}$

$f^{-1}(x) =$ $\sqrt[3]{x+6}$

(Type an expression for the inverse. Use integers or fractions for any numbers in the expression.)

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5. The function $f(x) = \frac{3}{x} + 1$, $x \neq 0$, is one-to-one.

$y = \frac{3}{x} + 1 \Rightarrow x = \frac{3}{y} + 1 \Rightarrow \frac{3}{y} = \frac{x-1}{1}$

Find an equation for $f^{-1}(x)$, the inverse function.

$\Rightarrow y(x-1) = 3(1)$

$\frac{y(x-1)}{x-1} = \frac{3}{x-1}$

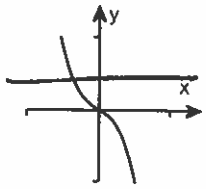
$f^{-1}(x) =$ $\frac{3}{x-1}$, $x \neq 0$

(Type an expression for the inverse. Use integers for any numbers in the expression.)

$\Rightarrow y = \frac{3}{x-1}$

$f^{-1}(x) = \frac{3}{x-1}$; $x \neq 0$

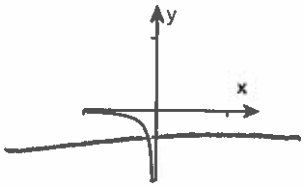
6. Does the graph represent a function that has an inverse?



Choose the correct answer below.

- (●) Yes
- ( ) No

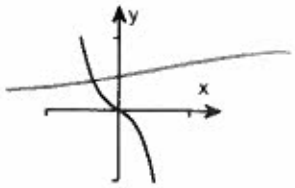
7. Does the graph represent a function that has an inverse?



Choose the correct answer below.

- ( ) No
- (●) Yes

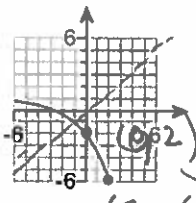
8. Does the graph represent a function that has an inverse?



Choose the correct answer below.

- (●) Yes
- ( ) No

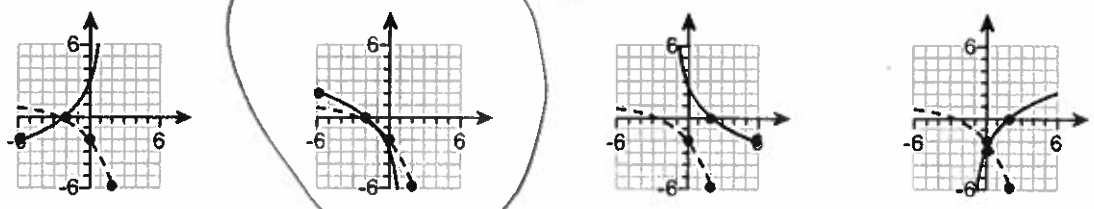
9. Use the graph of f to draw the graph of its inverse function.



on the graph of the inverse function this point is (2,0) → (-6,2)

Choose the correct graph of the inverse function f^{-1} below. The graph of f is dashed in each of the choices.

○ A. ○ B. ● C. ○ D.



10. For the function f(x) = 3x − 4 determine whether f(x) is one-to-one. If so, find a formula for the inverse, give the domain and the range for f^{-1}, and then graph both functions on the same axes.

$y = 3x - 4$
$\Rightarrow x = 3y - 4 \Rightarrow 3y = x + 4$
$\Rightarrow y = \frac{x+4}{3}$
or $f^{-1}(x) = \frac{x+4}{3}$

Is f(x) a one-to-one function?

○ No
● Yes

The inverse function is $f^{-1} =$ $\frac{x+4}{3}$.

Choose the correct domain below.

● A. $(-\infty,\infty)$ ○ B. $[-\infty,\infty]$
○ C. $(-\infty,0)$ ○ D. $(0,-\infty)$

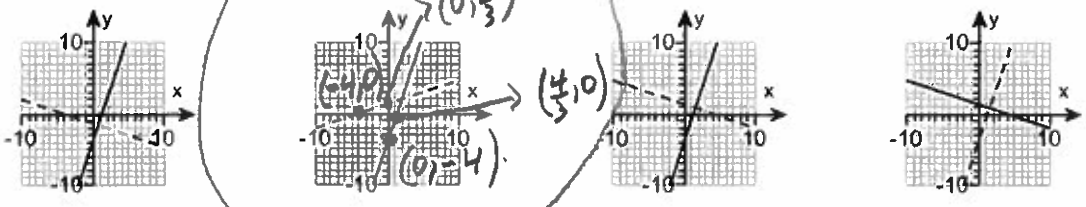
Note: $f(x)$: D → R, $f^{-1}(x)$: R → D

Choose the correct range below.

○ A. $(-\infty,0)$ ○ B. $[-\infty,\infty]$
● C. $(-\infty,\infty)$ ○ D. $(0,-\infty)$

Choose the correct graph for f and f^{-1} below.

○ A. ● B. ○ C. ○ D.



11. Given the function $f(x) = x^2 - 12,\ x \geq 0$,

$y = x^2 - 12 \Rightarrow x = y^2 - 12 \Rightarrow y^2 = x + 12$

$\Rightarrow y = \sqrt{x+12}$

$\Rightarrow f^{-1}(x) = \sqrt{x+12}$

(a) Find $f^{-1}(x)$.

(b) Graph f and f^{-1} in the same rectangular coordinate system.

(c) Use interval notation to give the domain and the range of f and f^{-1}.

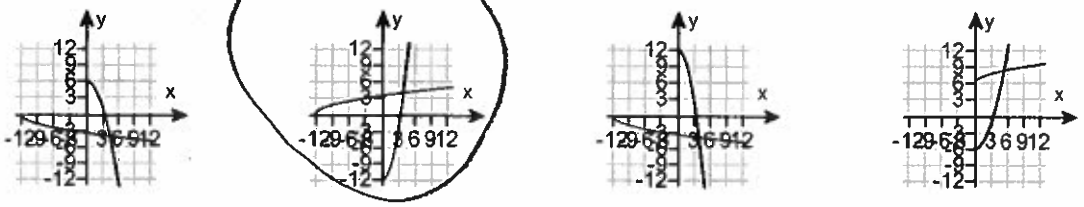
(a) Find $f^{-1}(x)$.

$f(x)$: $D = [0, \infty)$, $R = [-12, \infty)$ ⇄ $f^{-1}(x)$: $D = [-12, \infty)$, $R = [0, \infty)$

$f^{-1}(x) =$ _____

(b) Choose the correct graph which shows f and f^{-1} graphed in the same coordinate system.

○ A. ● B. ○ C. ○ D.



(c) State the domain and range of f and f^{-1} using interval notation.

Domain of f = Range of f^{-1} = $[0, \infty)$

Range of f = Domain of f^{-1} = $[-12, \infty)$

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12. The functions f and g are defined by the following tables. Use the tables to evaluate the given composite function.

$f(g(9)) = f(-2) = 2$.

x	f(x)
3	−2
4	0
5	1
−2	2

$f(-2) = 2$

x	g(x)
−3	−5
3	1
4	2
9	−2

$g(9) = -2$.

$f(g(9)) =$ 2

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13. The functions f and g are defined by the following tables. Use the tables to evaluate the given composite function.

$(g \circ f)(-1) = g(f(-1)) = g(3) = 1$

x	f(x)
−1	3
0	4
1	5
3	−1

x	g(x)
−4	−5
3	1
6	2
9	−1

$(g \circ f)(-1) =$ 1

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14. The functions f and g are defined by the following tables. Use the tables to evaluate the given composite function.

$f^{-1}(g(9)) = f^{-1}(4) = 0$

x	f(x)
−1	3
0	4
1	5
5	−6

x	g(x)
−2	0
3	1
4	2
9	4

$f^{-1}(g(9)) =$ 0

1. x

x

f and g are inverses of each other.

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2. $\frac{2x-45}{7}$

$\frac{2x-5}{7}$

f and g are not inverses of each other.

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3. $\frac{x-2}{8}$

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4. $\sqrt[3]{x+6}$

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5. $\frac{3}{x-1}$

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6. Yes

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7. Yes

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8. Yes

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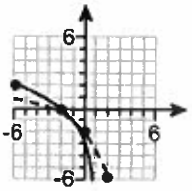
9. 

B.

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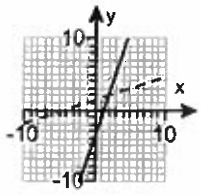
10. Yes

$\frac{x+4}{3}$

A. $(-\infty,\infty)$

C. $(-\infty,\infty)$



B.

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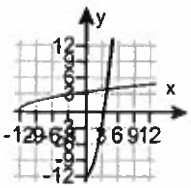
11. $\sqrt{x+12}$



B.

$[0,\infty)$

$[-12,\infty)$

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12. 2

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13. 1

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14. 0
