

Composite and Inverse Functions Practice

Name: _____

Date: _____

Question 1

Solve

I. $t(x) = 5x + 1$ $r(x) = 2x^2 - 7$

$(r \circ t)(-5)$

$(t \circ r)(-5)$

II. $g(x) = x + 7$ $h(x) = 1/x^2$

$(h \circ g)(3)$

$(g \circ h)(3)$

III. $a(x) = 10 - x$ $b(x) = \sqrt{x}$

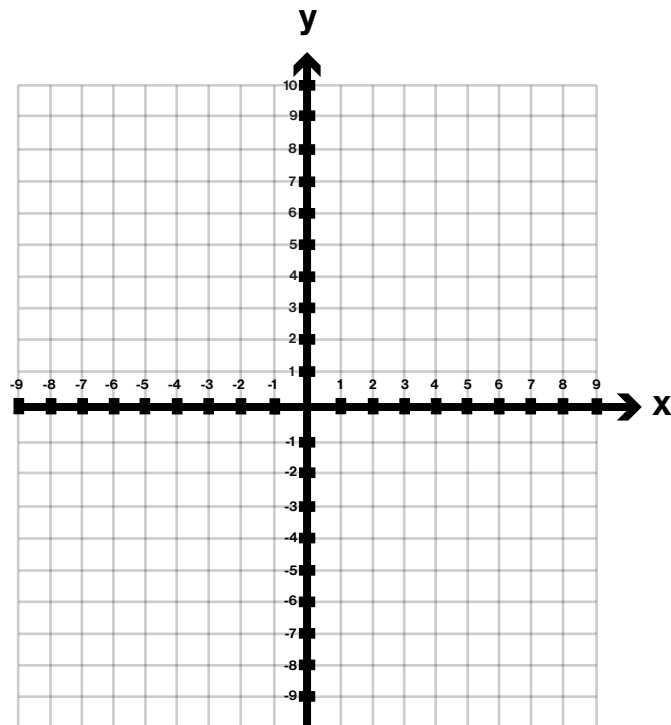
$(b \circ a)(9)$

$(a \circ b)(9)$

Question 2

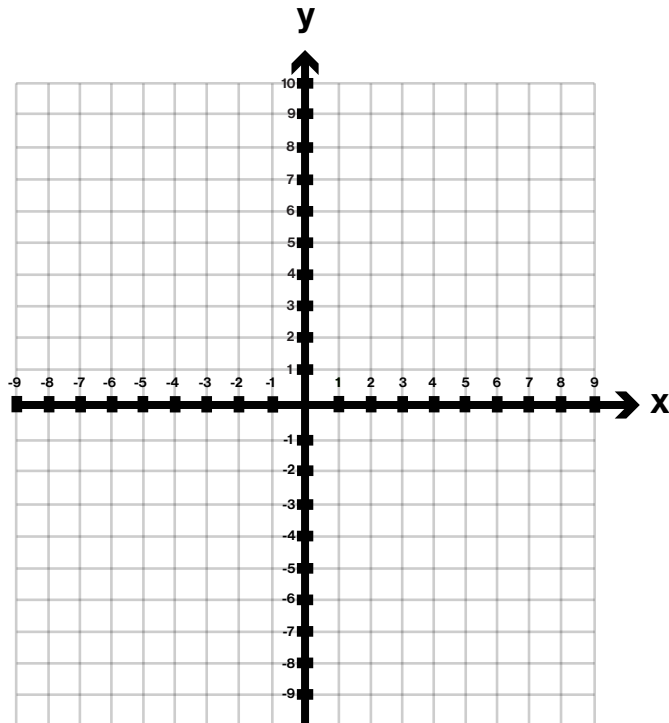
Determine if the function is one-to-one

I. $t(x) = x^2 + 3$



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II. $t(x) = -x$



Question 3

Find the inverse function

I. $p(x) = x + 3$

II. $m(x) = 2x$

III. $g(x) = (1/2)x + 1$

IV. $q(x) = x^3 + 5$

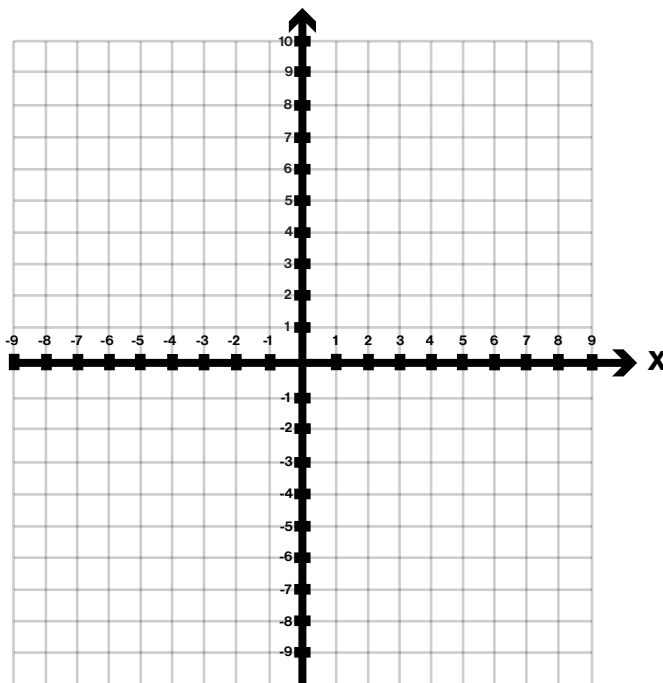
V. $w(x) = \sqrt{x}$

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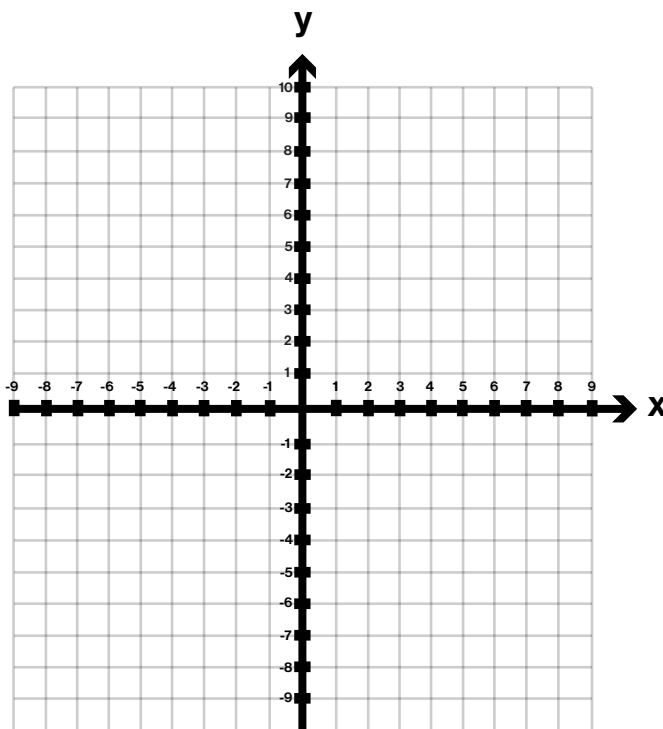
Question 4

Graph the inverse function

I. $t(x) = (2/3)x + 4$



II. $g(x) = -x^2, x \geq 0$



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Question 5

Prove that the functions are inverses of each other

1. $t(x) = \sqrt[3]{x-4}$ $t^{-1}(x) = x^3 + 4$

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Name: _____ **Key** _____

Date: _____

Question 1

Solve

I. $t(x) = 5x + 1$ $r(x) = 2x^2 - 7$

$$(r \circ t)(-5) \rightarrow t(-5) = 5(-5) + 1 = -24 \rightarrow r(-24) = 2(-24)^2 - 7 = 1,145$$

$$(t \circ r)(-5) \rightarrow r(-5) = 2(-5)^2 - 7 = 43 \rightarrow t(43) = 5(43) + 1 = 216$$

II. $g(x) = x + 7$ $h(x) = 1/x^2$

$$(h \circ g)(3) \rightarrow g(3) = (3) + 7 = 10 \rightarrow h(10) = 1/(10)^2 = 0.01$$

$$(g \circ h)(3) \rightarrow h(3) = 1/(3)^2 = 1/9 \rightarrow g(1/9) = (1/9) + 7 = 64/9$$

III. $a(x) = 10 - x$ $b(x) = \sqrt{x}$

$$(b \circ a)(9) \rightarrow a(9) = 10 - 9 = 1 \rightarrow b(1) = \sqrt{1} = 1$$

$$(a \circ b)(9) \rightarrow b(9) = \sqrt{9} = 3 \rightarrow a(3) = 10 - 3 = 7$$

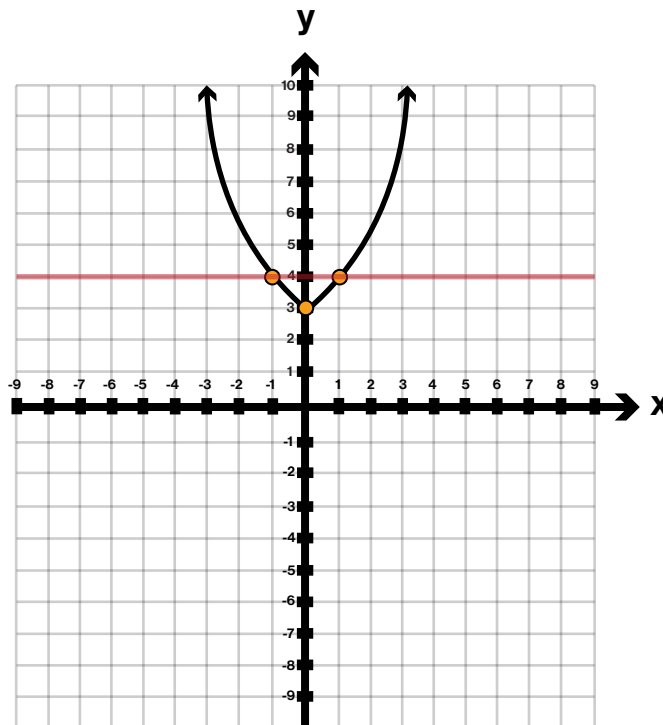
Question 2

Determine if the function is one-to-one

I. $t(x) = x^2 + 3$

Fail

Not one-to-one

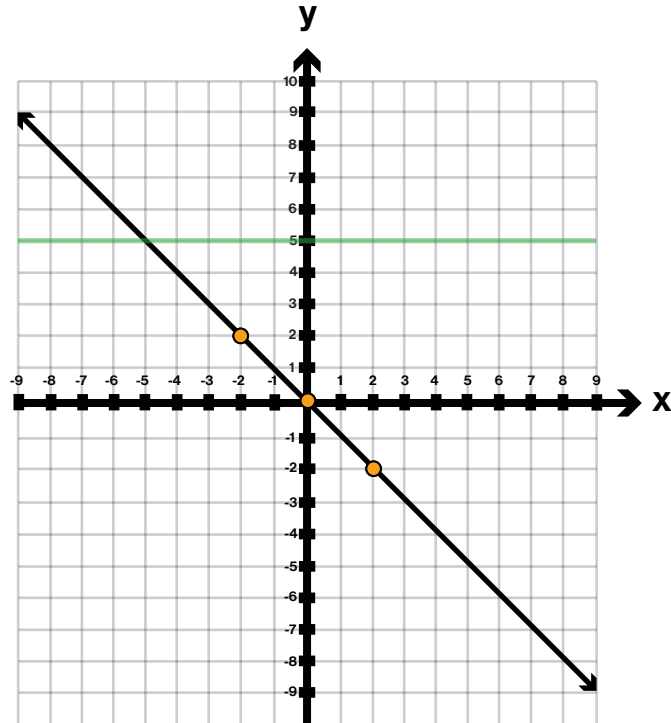


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II. $t(x) = -x$

Pass

One-to-one



Question 3

Find the inverse function

I. $p(x) = x + 3 \rightarrow y = x + 3 \rightarrow x = y + 3 \rightarrow x - 3 = y \rightarrow p^{-1}(x) = x - 3$

II. $m(x) = 2x \rightarrow y = 2x \rightarrow x = 2y \rightarrow x/2 = y \rightarrow m^{-1}(x) = x/2$

III. $g(x) = (1/2)x + 1 \rightarrow y = (1/2)x + 1 \rightarrow x = (1/2)y + 1 \rightarrow 2x - 2 = y \rightarrow g^{-1}(x) = 2x - 2$

IV. $q(x) = x^3 + 5 \rightarrow y = x^3 + 5 \rightarrow x = y^3 + 5 \rightarrow \sqrt[3]{x-5} = y \rightarrow q^{-1}(x) = \sqrt[3]{x-5}$

V. $w(x) = \sqrt{x} \rightarrow y = \sqrt{x} \rightarrow x = \sqrt{y} \rightarrow x^2 = y \rightarrow w^{-1}(x) = x^2$

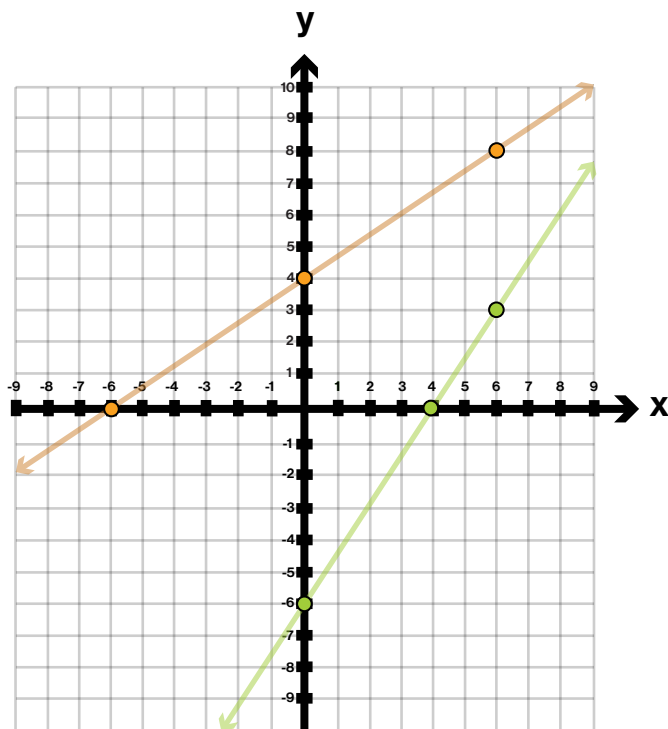
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Question 4

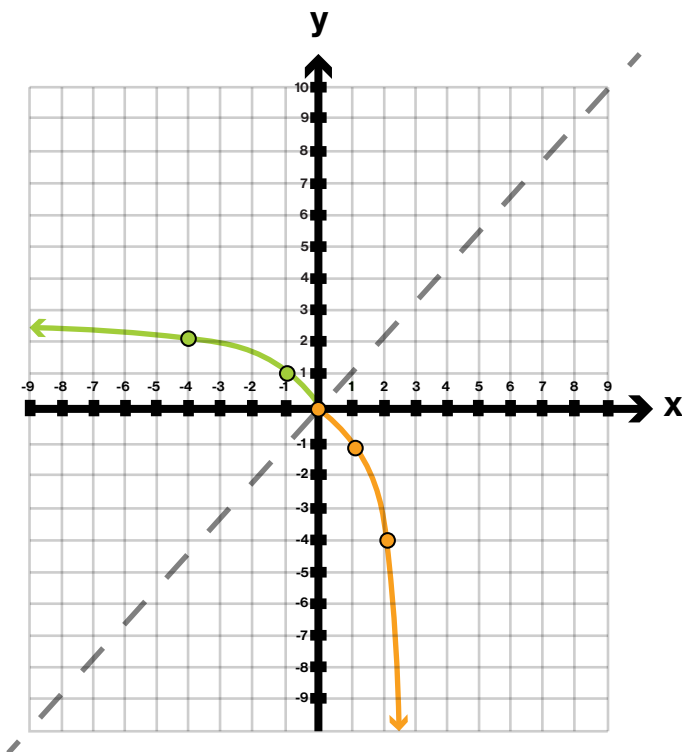
Graph the inverse function

I. $t(x) = (2/3)x + 4$ —

$$t(x) = (2/3)x + 4 \rightarrow y = (2/3)x + 4 \rightarrow x = (2/3)y + 4 \rightarrow \frac{3x - 12}{2} = y \rightarrow t^{-1}(x) = \frac{3x - 12}{2}$$
 —



II. $g(x) = -x^2, x \geq 0$ —



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Question 5

Prove that the functions are inverses of each other

$$1. \quad t(x) = \sqrt[3]{x-4} \quad t^{-1}(x) = x^3 + 4$$

$$(t \circ t^{-1})(x) \rightarrow \sqrt[3]{(x^3 + 4) - 4} \rightarrow x$$

$$(t^{-1} \circ t)(x) \rightarrow \left(\sqrt[3]{x-4} \right)^3 + 4 \rightarrow x$$