

A2.A.44: Inverse of Functions 2: Define the inverse of a function

- 1 If the graph of the equation $y = 2x$ is reflected in the line $y = x$, the equation of the image is
 - 1) $y = 2x$
 - 2) $y = \frac{x}{2}$
 - 3) $y = 2$
 - 4) $y = -\frac{x}{2}$
- 2 Which equation is the inverse of $y = 3x$?
 - 1) $x = 3$
 - 2) $y = \frac{1}{3}x$
 - 3) $y = 3$
 - 4) $x = \frac{y}{3}$
- 3 What is the inverse of $f(x) = -\frac{2}{3}x$?
 - 1) $f^{-1}(x) = \frac{2}{3}x - 3$
 - 2) $f^{-1}(x) = \frac{3}{2}x$
 - 3) $f^{-1}(x) = -\frac{3}{2}x$
 - 4) $f^{-1}(x) = -\frac{2}{3}x$
- 4 Which is an equation of the inverse of $y = \frac{3}{2}x$?
 - 1) $y = \frac{2}{3}x$
 - 2) $y = -\frac{3}{2}x$
 - 3) $y = 3x - 2$
 - 4) $y = \frac{x+3}{2}$
- 5 What is the inverse of the function $y = 3x + 2$?
 - 1) $3y = x + 2$
 - 2) $x = 3y + 2$
 - 3) $y = \frac{1}{3}x - 2$
 - 4) $x = \frac{1}{3}y + \frac{2}{3}$
- 6 If a function is defined by the equation $y = 3x + 2$, which equation defines the inverse of this function?
 - 1) $x = \frac{1}{3}y + \frac{1}{2}$
 - 2) $y = \frac{1}{3}x + \frac{1}{2}$
 - 3) $y = \frac{1}{3}x - \frac{2}{3}$
 - 4) $y = -3x - 2$

- 7 A function is defined by the equation $y = 5x - 5$. Which equation defines the inverse of this function?
- $y = \frac{1}{5x-5}$
 - $y = 5x + 5$
 - $x = \frac{1}{5y-5}$
 - $x = 5y - 5$
- 8 What is the inverse of the function $y = 2x - 3$?
- $y = \frac{x+3}{2}$
 - $y = \frac{x}{2} + 3$
 - $y = -2x + 3$
 - $y = \frac{1}{2x-3}$
- 9 What is the inverse of the function $y = 3x - 2$?
- $y = -3x + 2$
 - $y = \frac{x+2}{3}$
 - $y = \frac{x-2}{3}$
 - $3y = 2x$
- 10 What is an equation of the line formed when the line $y = 3x + 1$ is reflected in the line $y = x$?
- $y = 3x - 1$
 - $y = \frac{x-1}{3}$
 - $y = \frac{x}{3} - 1$
 - $x = y$
- 11 What is the inverse of the function $y = 2x + 3$?
- $x = \frac{1}{2}y - \frac{3}{2}$
 - $y = \frac{1}{2}x - \frac{3}{2}$
 - $y = 2x - 3$
 - $x = -2y - 3$
- 12 What equation is the inverse of $y = 13x + 2$?
- $y = 2x + 13$
 - $y = -13x - 2$
 - $y = \frac{x-2}{13}$
 - $y = \frac{x-13}{2}$
- 13 The inverse of the function $2x + 3y = 6$ is
- $y = -\frac{2}{3}x + 2$
 - $y = -\frac{3}{2}x + 3$
 - $y = \frac{3}{2}x + 2$
 - $y = \frac{2}{3}x + 3$
- 14 The inverse of the function $y = 2x - 5$ is
- $y = \frac{1}{2}(x + 5)$
 - $y = \frac{1}{2}(x - 5)$
 - $y = 2x + 5$
 - $y = 5 - 2x$

15 What is the inverse of the function $y - 2 = 7x$?

- 1) $y = \frac{2-x}{7}$
- 2) $y = \frac{2x}{7}$
- 3) $y = 7x - 2$
- 4) $y = \frac{x-2}{7}$

16 A function is defined by the equation $y = \frac{1}{2}x - \frac{3}{2}$.

Which equation defines the inverse of this function?

- 1) $y = 2x + 3$
- 2) $y = 2x - 3$
- 3) $y = 2x + \frac{3}{2}$
- 4) $y = 2x - \frac{3}{2}$

17 Which equation defines a function whose inverse is *not* a function?

- 1) $y = |x|$
- 2) $y = -x$
- 3) $y = 3x + 2$
- 4) $y = 2^x$

18 If $f(x) = 3x^2 + 1$ and $g(x) = 2x + 2$, find

a $g^{-1}(x)$, the inverse of $g(x)$.

b $(f \circ g^{-1})(2)$.

19 Given: $f(x) = 11x + 3$ and $g(x) = \sqrt{x}$.

Find: $f(2)$, $g(f(2))$, $g(100)$, $f^{-1}(x)$, $g^{-1}(3)$

20 What is the inverse of the function $f(x) = \log_4 x$?

- 1) $f^{-1}(x) = x^4$
- 2) $f^{-1}(x) = 4^x$
- 3) $f^{-1}(x) = \log_x 4$
- 4) $f^{-1}(x) = -\log_x 4$

21 The inverse of a function is a logarithmic function in the form $y = \log_b x$. Which equation represents the original function?

- 1) $y = b^x$
- 2) $y = bx$
- 3) $x = b^y$
- 4) $by = x$

22 Given: $f(x) = x^2$ and $g(x) = 2^x$

a The inverse of g is a function, but the inverse of f is not a function. Explain why this statement is true.

b Find $g^{-1}(f(3))$ to the *nearest tenth*.

23 If $f(x) = x^2 - 6$, find $f^{-1}(x)$.

24 Which two functions are inverse functions of each other?

- 1) $f(x) = \sin x$ and $g(x) = \cos(x)$
- 2) $f(x) = 3 + 8x$ and $g(x) = 3 - 8x$
- 3) $f(x) = e^x$ and $g(x) = \ln x$
- 4) $f(x) = 2x - 4$ and $g(x) = -\frac{1}{2}x + 4$

A2.A.44: Inverse of Functions 2: Define the inverse of a function**Answer Section**

- 1 ANS: 2 REF: 088927siii
 2 ANS: 2 REF: 089532siii
 3 ANS: 3 REF: 088432siii
 4 ANS: 1 REF: 089728siii
 5 ANS: 2 REF: 019626siii
 6 ANS: 3 REF: 010209b
 7 ANS: 4 REF: 080205b
 8 ANS: 1 REF: 080918b
 9 ANS: 2 REF: 011011b
 10 ANS: 2 REF: 088530siii
 11 ANS: 2 REF: 068635siii
 12 ANS: 3 REF: 010434siii
 13 ANS: 2 REF: 089024siii
 14 ANS: 1 REF: 080028siii
 15 ANS: 4 REF: 060126siii
 16 ANS: 1 REF: 080319b
 17 ANS: 1 REF: 068932siii
 18 ANS:

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

b 1

REF: 089340sii

- 19 ANS:
 25, 5, 10, $\frac{x-3}{11}$, 9

REF: 019641siii

- 20 ANS: 2 REF: 061521a2
 21 ANS: 1 REF: 060115b
 22 ANS:

$$a \ g(x) = y = 2^x$$

$$g^{-1}(x) = x = 2^y$$

$$\log x = \log 2^y$$

$$\log x = y \log 2$$

$$y = \frac{\log x}{\log 2}, \text{ which is a function because}$$

for every value of x , there is a unique y .

b 3.2

REF: 010332b

$$f(x) = y = x^2$$

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

$y = \pm\sqrt{x}$, which is not a function because for every value of x , there is not a unique y .

23 ANS:

 $y = x^2 - 6$. $f^{-1}(x)$ is not a function.

$$x = y^2 - 6$$

$$x + 6 = y^2$$

$$\pm\sqrt{x+6} = y$$

REF: 061132a2

24 ANS: 3

REF: 081027a2