F.BF.B.4: Inverse of Functions 5

1 The image of function f(x) is found by mapping each point on the function (x,y) to the point (y,x). This image is a reflection of f(x) in
1) the x-axis
2) the y-axis
3) the line whose equation is $y = x$
4) the line whose equation is $y = -x$

2 By what transformation can the set representing the inverse of a function be found?
1) reflection in the origin
2) reflection in the line $y = x$
3) rotation of 90º about the origin
4) reflection in the y-axis

3 If the point (a,b) lies on the graph y = f(x), the graph of $y = f^{-1}(x)$ must contain point
1) (b,a)
2) (a,0)
3) (0,b)
4) ($-a$,$-b$)

4 The inverse function of $\{(2,6),(-3,4),(7,-5)\}$ is
1) $\{(-2,6),(3,4),(-7,-5)\}$
2) $\{(2,-6),(-3,-4),(7,5)\}$
3) $\{(6,2),(4,-3),(-5,7)\}$
4) $\{(-6,-2),(-4,3),(5,-7)\}$

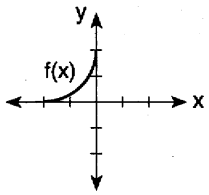
5 If $m = \{(-1,1),(1,1),(-2,4),(2,4),(-3,9),(3,9)\}$, which statement is true?
1) m and its inverse are both functions.
2) m is a function and its inverse is not a function.
3) m is not a function and its inverse is a function.
4) Neither m nor its inverse is a function.

6 Given the relation A: $\{(3,2),(5,3),(6,2),(7,4)\}$ Which statement is true?
1) Both A and A^{-1} are functions.
2) Neither A nor A^{-1} is a function.
3) Only A is a function.
4) Only A^{-1} is a function.

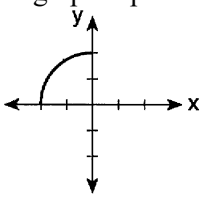
7 Given: set A: $\{(1,2),(2,3),(3,4),(4,5)\}$
If the inverse of the set is A^{-1}, which statement is true?
1) A and A^{-1} are functions.
2) A nor A^{-1} are not functions.
3) A is a function and A^{-1} is not a function.
4) A is not a function and A^{-1} is a function.

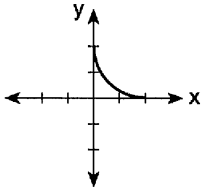
8 Write the inverse of the given function: $\{(5,3),(-2,4),(7,-2)\}$

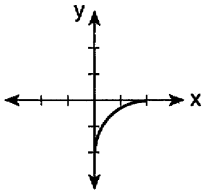
9 The accompanying diagram represents the graph of f(x).

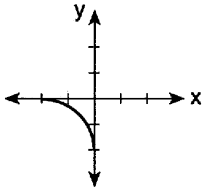


Which graph represents $f^{-1}(x)$?

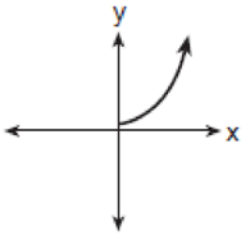
1)


2)


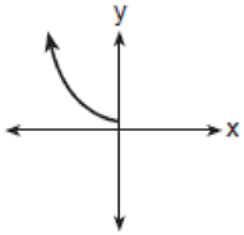
3)


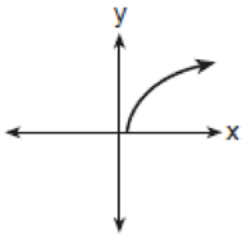
4)


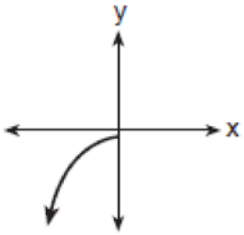
10 The accompanying graph shows the relationship between kinetic energy, y, and velocity, x.

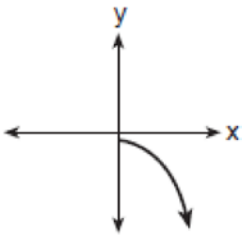


The reflection of this graph in the line $y = x$ is

1)


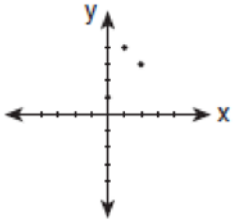
2)


3)


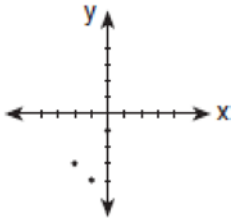
4)


11 Which graph represents the inverse of $f(x) = \{(0,1),(1,4),(2,3)\}$?

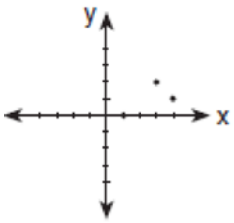
1)



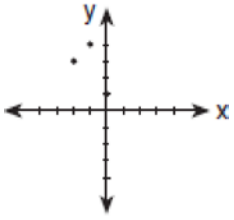
2)



3)

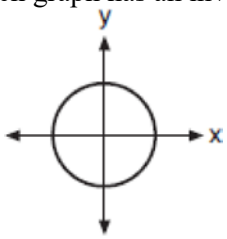


4)

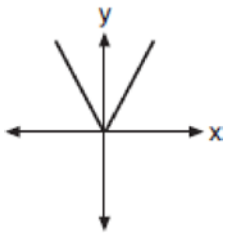


12 Which graph has an inverse that is a function?

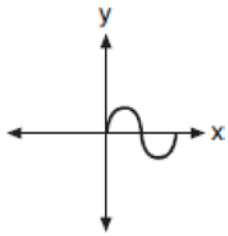
1)



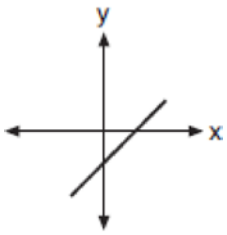
2)



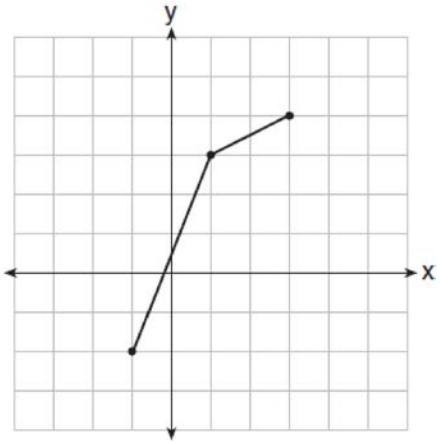
3)



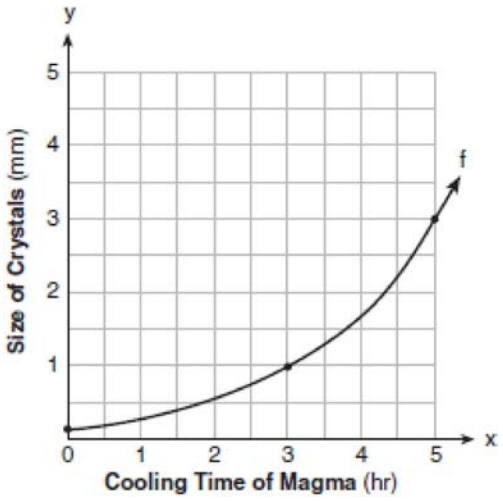
4)



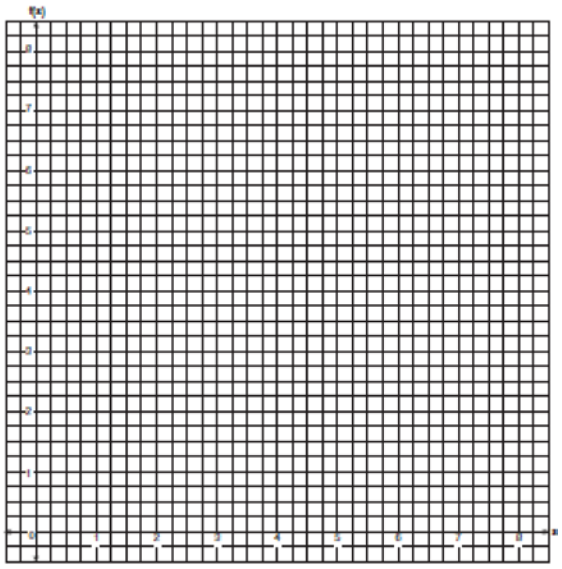
13 The function, f, is drawn on the accompanying set of axes. On the same set of axes, sketch the graph of f^{-1}, the inverse of f.



14 The accompanying graph shows the relationship between the cooling time of magma and the size of the crystals produced after a volcanic eruption. On the same graph, sketch the inverse of this function.



15 Draw $f(x) = 2x^2$ and $f^{-1}(x)$ in the interval $0 \le x \le 2$ on the accompanying set of axes. State the coordinates of the points of intersection.



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

17 If $f(x) = 3x - 2$ and $f^{-1}(x) = \frac{x+2}{3}$, then $f \circ f^{-1}(x)$ equals

1) x
2) $\frac{1}{x}$
3) $(3x-2) \div \left(\frac{x+2}{3}\right)$
4) $(3x-2) \bullet \left(\frac{x+2}{3}\right)$

18 When $f(x) = \frac{x-7}{2}$, what is the value of $\left(f \circ f^{-1}\right)(3)$?

1) $2x + 7$
2) -2
3) 3
4) x

19 Given: $f(x) = 11x + 3$ and $g(x) = \sqrt{x}$.
Find: $f(2)$, $g(f(2))$, $g(100)$, $f^{-1}(x)$, $g^{-1}(3)$

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Answer Section

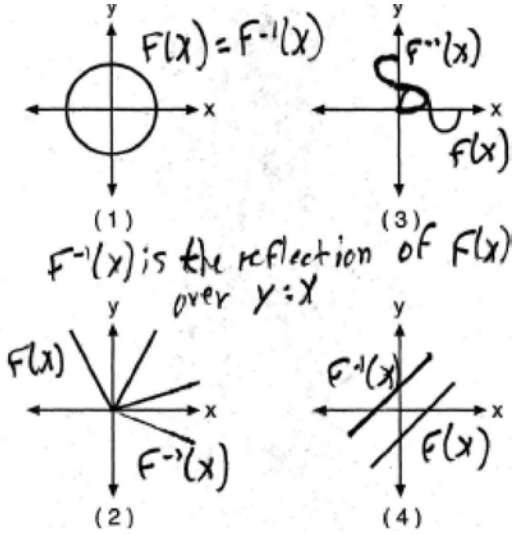
1 ANS: 3 REF: 011010b
2 ANS: 2 REF: 018730siii
3 ANS: 1 REF: 080216b
4 ANS: 3 REF: 019024siii
5 ANS: 2 REF: 081523a2
6 ANS: 3

A is a function because for every *x*, there is a unique *y*. A^{-1} is not a function. For the element "2" in the domain, there are two elements in the range, "3" and "6".

REF: 010914b
7 ANS: 1 REF: 069424siii
8 ANS:
$\{(3,5),(4,-2),(-2,7)\}$

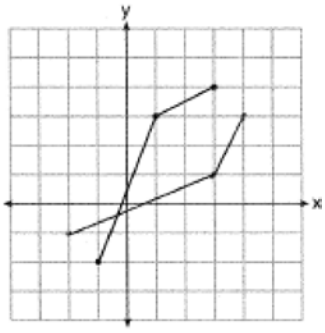
REF: 069009siii
9 ANS: 3 REF: 069623siii
10 ANS: 2 REF: 080820b
11 ANS: 3
$f^{-1}(x) = \{(1,0),(4,1),(3,2)\}$

REF: 060220b
12 ANS: 4



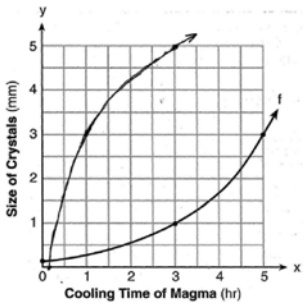
REF: 080712b

13 ANS:



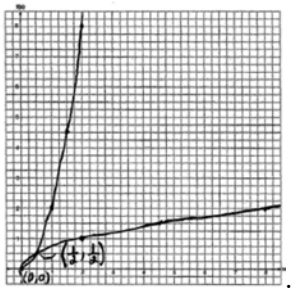
REF: 011024b

14 ANS:



REF: 060926b

15 ANS:



$y = 2x^2$

$x = 2y^2$

$\frac{x}{2} = y^2$

$y = f^{-1}(x) = \pm\sqrt{\frac{x}{2}}$

REF: 060130b

16 ANS:

$y = x^2 - 6$

$x = y^2 - 6$

$x + 6 = y^2$

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

REF: 061132a2

17 ANS: 1

$f \circ f^{-1}(x) = 3\left(\frac{x+2}{3}\right) - 2 = x + 2 - 2 = x$

REF: 011726a2

18 ANS: 3

$x = \frac{y-7}{2}$ $f^{-1}(3) = 2(3) + 7 = 13$

$y = 2x + 7$ $f(13) = \frac{13-7}{2} = 3$

REF: 061619a2

19 ANS:

25, 5, 10, $y = \frac{x-3}{11}$, 9

REF: 019641siii