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

1 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) $(-a,-b)$

2 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 $y = -x$

3 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) $\{(-6,-2),(-4,3),(5,-7)\}$

4 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.

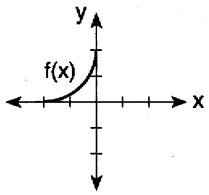
5 Given the relation $A$: $\{(3,2),(5,3),(6,2),(7,4)\}$
Which statement is true?
1) Both $A$ and $A^{-1}$ are functions.
2) Neither $A$ nor $A^{-1}$ is a function.
3) Only $A$ is a function.
4) Only $A^{-1}$ is a function.

6 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.

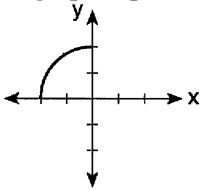
7 Write the inverse of the given function:
$\{(5,3),(-2,4),(7,-2)\}$

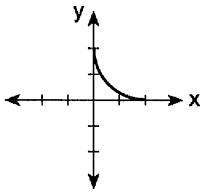
8 By what transformation can the set representing the inverse of a function be found?
1) reflection in the origin
2) reflection in the line $y = x$
3) rotation of 90° about the origin
4) reflection in the $y$-axis

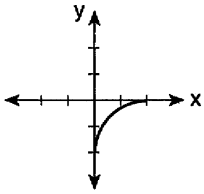
9 The accompanying diagram represents the graph of f($x$).

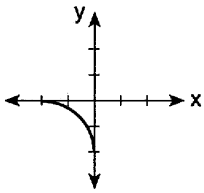



Which graph represents $f^{-1}(x)$?

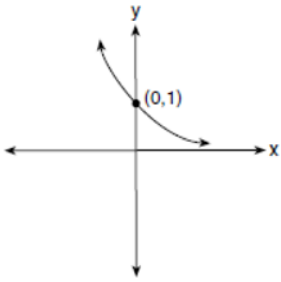
1)


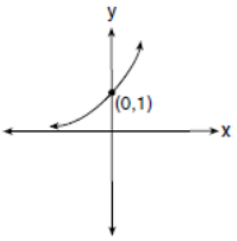

2)



3)



4)



10 The graph of $f(x)$ is shown below. Which graph represents $f^{-1}(x)$?




1)
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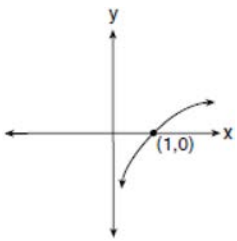
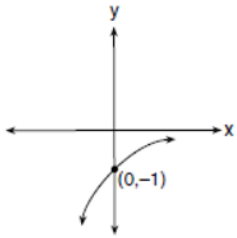
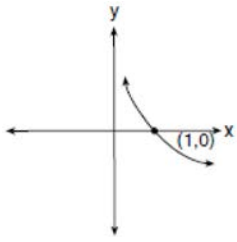
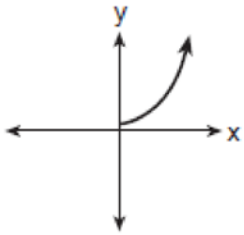


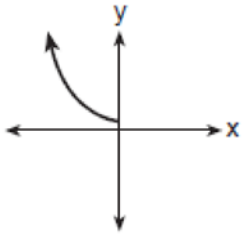

3)


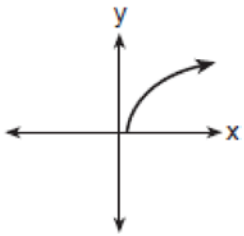

4)


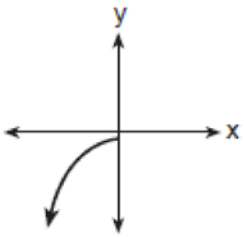
11 The accompanying graph shows the relationship between kinetic energy, $y$, and velocity, $x$.




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

1)



2)



3)
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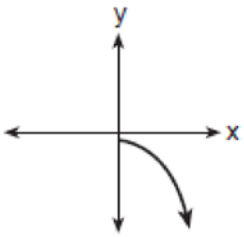
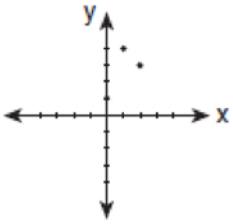
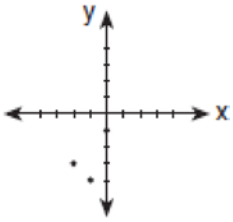
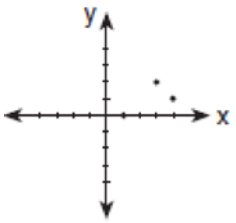
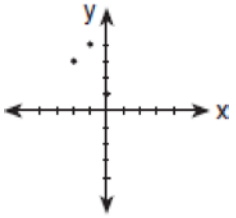



12 Which graph represents the inverse of $f(x) = \{(0,1),(1,4),(2,3)\}$?

1)


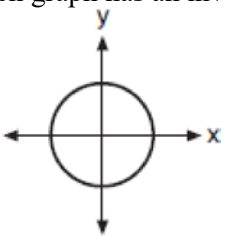

2)



3)


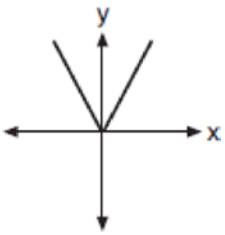

4)


13 Which graph has an inverse that is a function?

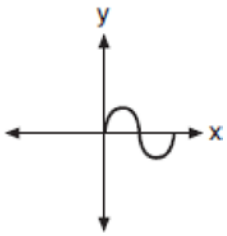
1)



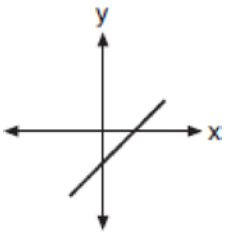

2)



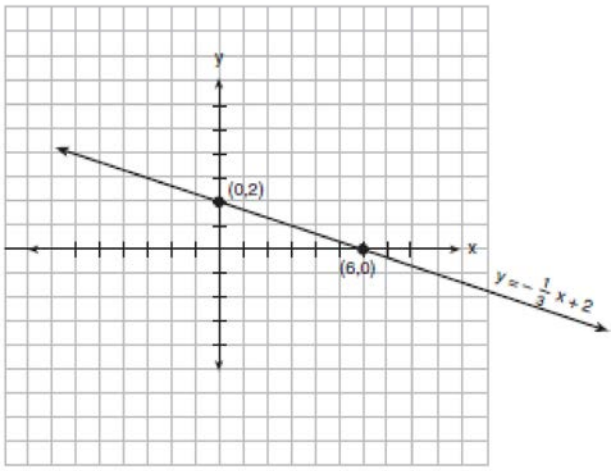

3)



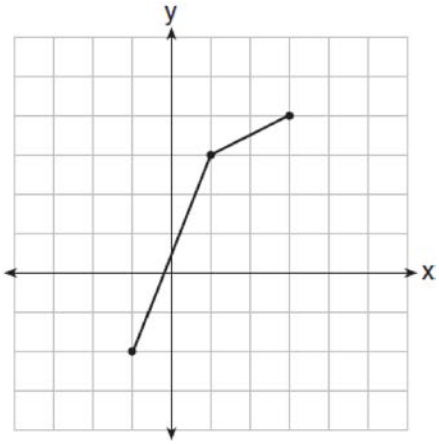

4)



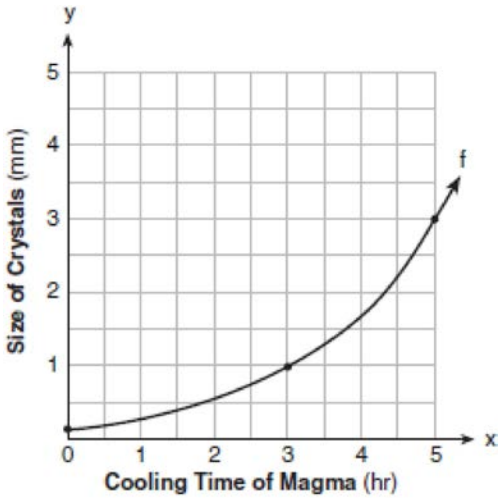

14 The accompanying diagram shows the graph of the line whose equation is $y = -\frac{1}{3}x + 2$. On the same set of axes, sketch the graph of the inverse of this function. State the coordinates of a point on the inverse function.



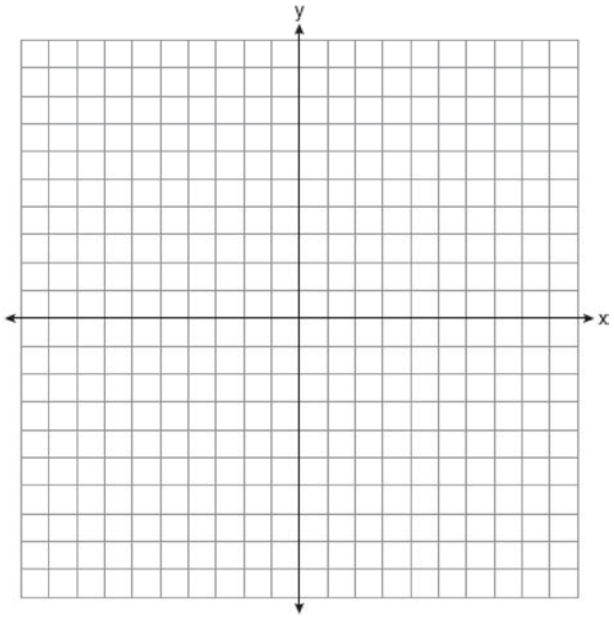

15 The function, $f$, is drawn on the accompanying set of axes. On the same set of axes, sketch the graph of $f^{-1}$, the inverse of $f$.



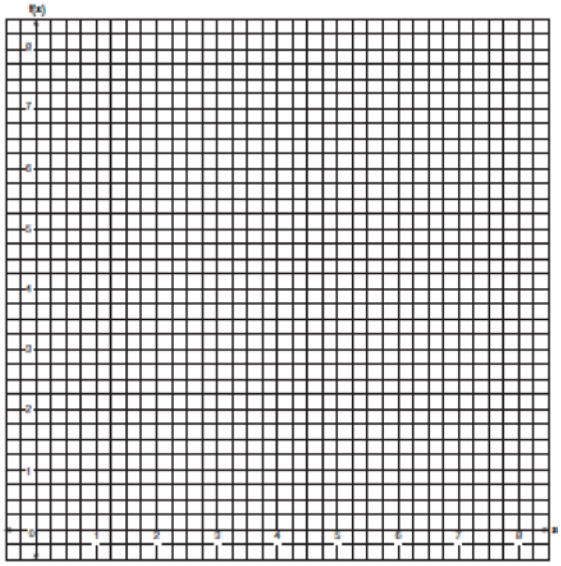
16 The accompanying graph shows the relationship between the cooling time of magma and the size of the crystals produced after a volcanic eruption. On the same graph, sketch the inverse of this function.




17 On the accompanying set of axes, graph the function $f(x) = 2x + 4$ and its inverse, $f^{-1}(x)$.




18 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.



19 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) $(3x-2) \bullet \left(\frac{x+2}{3}\right)$

20 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) $x$

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

## F.BF.B.4: Inverse of Functions 5
## Answer Section

1 ANS: 1 REF: 080216b
2 ANS: 3 REF: 011010b
3 ANS: 3 REF: 019024siii
4 ANS: 2 REF: 081523a2
5 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".

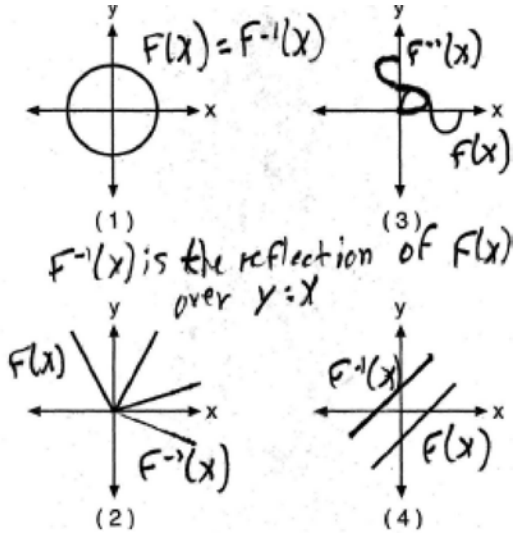
REF: 010914b
6 ANS: 1 REF: 069424siii
7 ANS:

$\{(3,5),(4,-2),(-2,7)\}$

REF: 069009siii
8 ANS: 2 REF: 018730siii
9 ANS: 3 REF: 069623siii
10 ANS: 4 REF: 011727a2
11 ANS: 2 REF: 080820b
12 ANS: 3

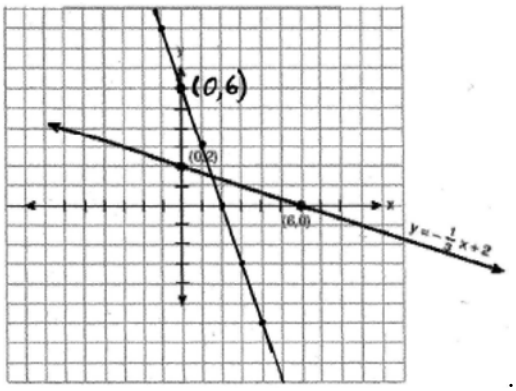
$f^{-1}(x) = \{(1,0),(4,1),(3,2)\}$

REF: 060220b
13 ANS: 4




REF: 080712b

14 ANS:




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

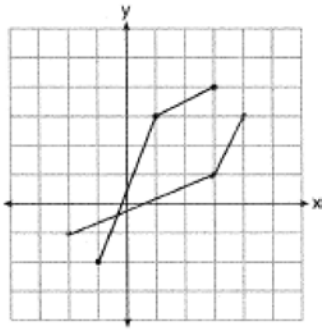
$$x = -\frac{1}{3}y + 2$$

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

$$-3x + 6 = y$$

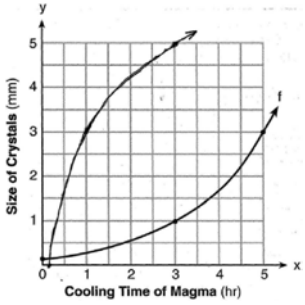
REF: 010521b

15 ANS:



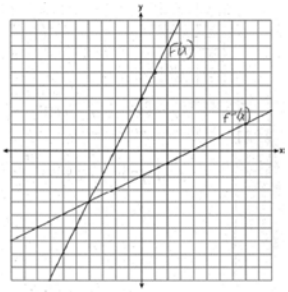

REF: 011024b

16 ANS:



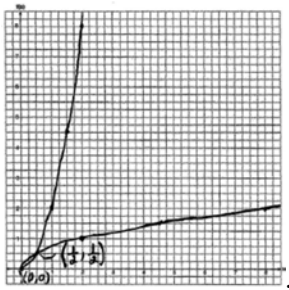

REF: 060926b

17 ANS:



REF: 080826b

18 ANS:



$y = 2x^2$

$x = 2y^2$

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

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

REF: 060130b

19 ANS: 1

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

REF: 011726a2

20 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

21 ANS:

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

REF: 019641siii