A2.A.44: Define the inverse of a function

1. 010209b, P.I. A2.A.44
    If a function is defined by the equation
    $y = 3x + 2$, which equation defines the
    inverse of this function?

    [A] $y = -3x - 2$ [B] $x = \frac{1}{3}y + \frac{1}{2}$

    [C] $y = \frac{1}{3}x + \frac{1}{2}$ [D] $y = \frac{1}{3}x - \frac{2}{3}$

2. 080205b, P.I. A2.A.44
    A function is defined by the equation
    $y = 5x - 5$. Which equation defines the
    inverse of this function?

    [A] $x = 5y - 5$ [B] $y = 5x + 5$

    [C] $x = \frac{1}{5y - 5}$ [D] $y = \frac{1}{5x - 5}$

3. 080319b, P.I. A2.A.44
    A function is defined by the equation
    $y = \frac{1}{2}x - \frac{3}{2}$. Which equation defines the
    inverse of this function?

    [A] $y = 2x + 3$ [B] $y = 2x - 3$

    [C] $y = 2x - \frac{3}{2}$ [D] $y = 2x + \frac{3}{2}$
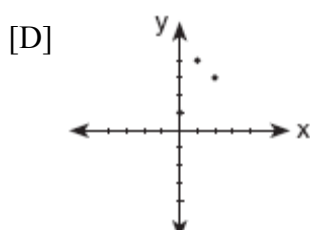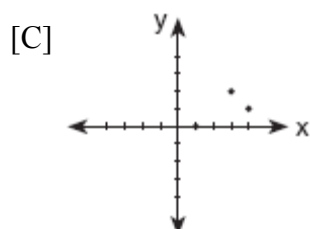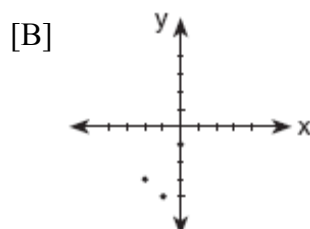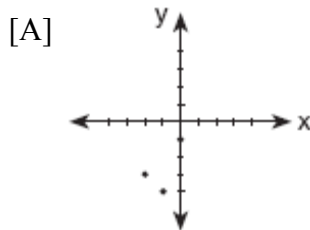
4. 080216b, P.I. A2.A.44
    If the point (a, b) lies on the graph $y = f(x)$,
    the graph of $y = f^{-1}(x)$ must contain point

    [A] $(-a,-b)$ [B] (b,a)
    [C] $(a,0)$ [D] $(0,b)$

5. 060220b, P.I. A2.A.44
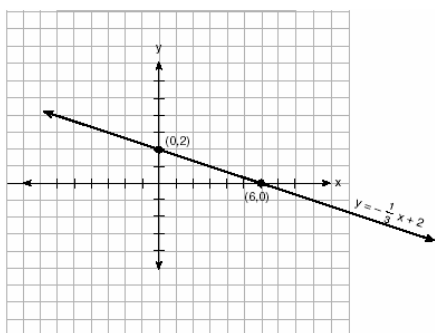   Which graph represents the inverse of $f(x) = \{(0,1),(1,4),(2,3)\}$?

    [A]

    [B]

    [C]

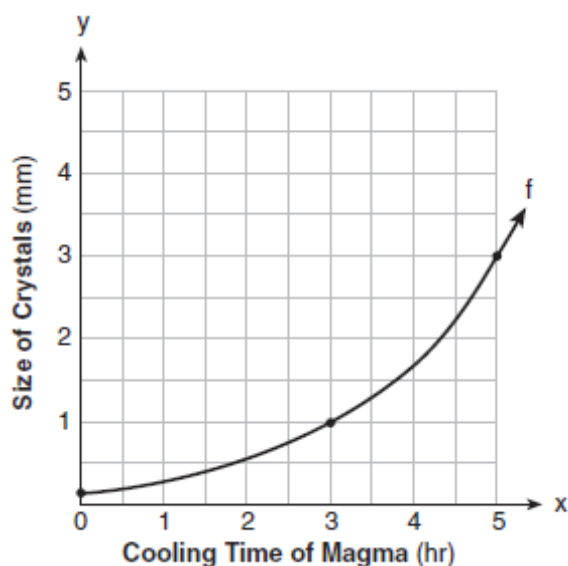   [D]

6. 010521b, P.I. A2.A.44

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
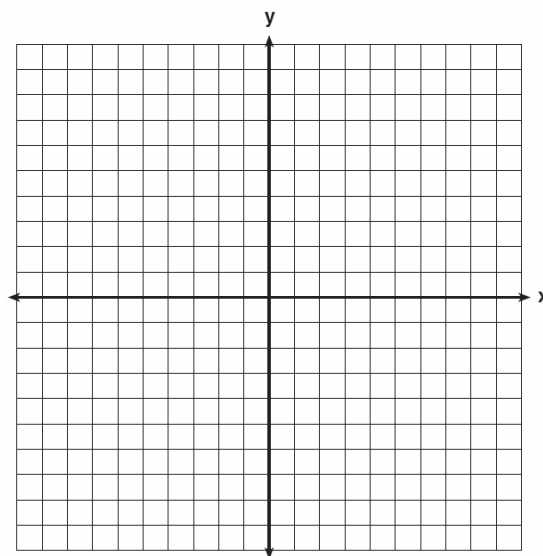coordinates of a point on the inverse function.

7. 060926b, P.I. A2.A.44

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,
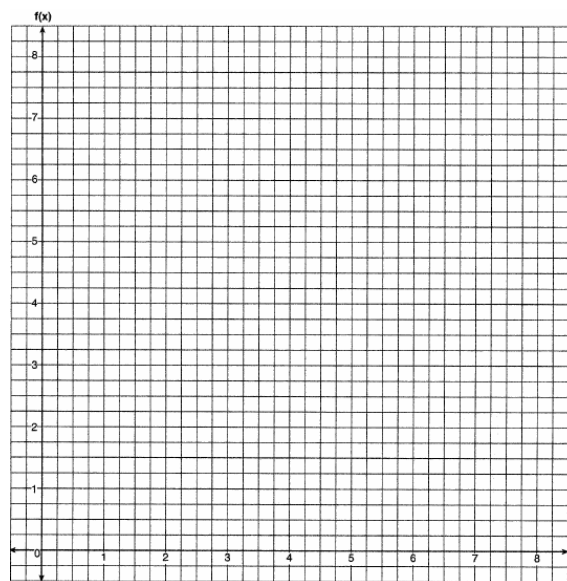sketch the inverse of this function.

8. 080826b, P.I. A2.A.44

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

9. 060130b, P.I. A2.A.44

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.

10. 010914b, P.I. A2.A.44
Given the relation
    A: {(3,2), (5,3), (6,2), (7,4)}
Which statement is true?

[A] Only A is a function.

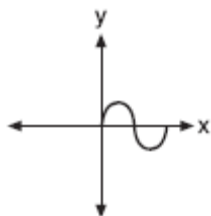[B] Both A and A^{-1} are functions.

[C] Only A^{-1} is a function.

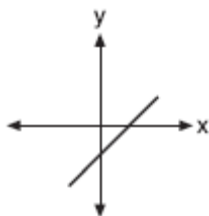[D] Neither A nor A^{-1} are functions.

11. 080712b, P.I. A2.A.44
Which graph has an inverse that is a function?

[A]   [B]

[C]   [D]

12. 010332b, P.I. A2.A.44
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*.

13. 080416b, P.I. A2.A.44
What is the inverse of the function
$y = \log_4 x$?

[A] $4^y = x$ [B] $y^4 = x$

[C] $4^x = y$ [D] $x^4 = y$

14. 060115b, P.I. A2.A.44
The inverse of a function is a logarithmic function in the form $y = \log_b x$. Which equation represents the original function?

[A] $x = b^y$ [B] $by = x$

[C] $y = bx$ [D] $y = b^x$

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[1] D

[2] A

[3] A

[4] B

[5] C

[2] An appropriate reflection of f(x) in the line
$y = x$ is sketched, and the coordinates of one
point are stated correctly.
[1] An appropriate graph is sketched, but no
coordinates or incorrect coordinates are
stated.
or [1] A reflection in some other line is
sketched, but appropriate coordinates are
stated.
or [1] An incorrect graph is sketched, based
on an error in plotting one of the points, but
appropriate coordinates are stated.
[0] A zero response is completely incorrect,
irrelevant, or incoherent or is a correct
response that was obtained by an obviously
[6] incorrect procedure.

[2] The inverse function is graphed correctly.
[1] One graphing error is made.
[0] A zero response is completely incorrect,
irrelevant, or incoherent or is a correct
response that was obtained by an obviously
[7] incorrect procedure.

[2] Both $f(x)$ and $f^{-1}(x)$ are graphed
correctly and at least one is labeled.
[1] Appropriate work is shown, but one
graphing error is made.
or [1] Appropriate work is shown, but one
conceptual error is made, such as graphing the
inverse as a reflection over an axis.
or [1] $f(x)$ is graphed incorrectly, but an
appropriate graph is drawn for $f^{-1}(x)$.
or [1] A correct equation for $f^{-1}(x)$ is
written, but no graphs are drawn.
[0] $f(x)$ is graphed correctly, but no further
correct work is shown.
or [0] A zero response is completely
incorrect, irrelevant, or incoherent or is a
correct response that was obtained by an
[8] obviously incorrect procedure.

[4] (0,0) and $(\frac{1}{2},\frac{1}{2})$, and both graphs are drawn correctly.

[3] Both graphs are drawn correctly, but one or both points of intersection are stated incorrectly.

or [3] The graph of $y = 2x^2$ is incorrect, but the inverse is appropriate or correct, and the appropriate points of intersection are stated correctly.

[2] Both points of intersection are found correctly, using an algebraic solution.

or [2] The graph of $y = 2x^2$ is incorrect, but the inverse is appropriate or correct, but no further work is shown.

or [2] The graph of $y = 2x^2$ is correct, but the inverse is incorrect, but the appropriate points of intersection are stated.

or [2] The graph of $y = 2x^2$ is incorrect, but the inverse is correct, but the points of intersection are not stated or are incorrect.

[1] Both graphs are incorrect, but the points of intersection are appropriate, based on the incorrect graphs.

or [1] The graph of $y = 2x^2$ is correct, but the inverse is incorrect, and the points of intersection are labeled or stated incorrectly.

or [1] (0,0) and $(\frac{1}{2},\frac{1}{2})$, but no work is shown.

[0] Straight lines are used as graphs of the functions.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[9]   obviously incorrect procedure.

[10] A

[11] B

a [2] Appropriate sketches of the functions are shown, and the horizontal line tests are used to explain why the statement is true.

or [2] An explanation is given that the inverse of g is a function and the inverse of f is not a function, which includes a definition of the relationship between a function and its inverse or the vertical line test.

or [2] Appropriate sketches of the inverses are shown that use the vertical line test to explain why the statement is true.

or [2] The correct inverses are found algebraically, and appropriate explanations are given.

[1] An explanation is given that indicates only that g is a 1:1 function or that g passes the horizontal line test.

or [1] An explanation is given that indicates only that f is not a 1:1 function or that f does not pass the horizontal line test.

b [2] 3.2, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] 3.2, but no work is shown.

a and b [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[12] obviously incorrect procedure.

[13] C

[14] D