

Name Key  
Algebra 2 Functions Review #1

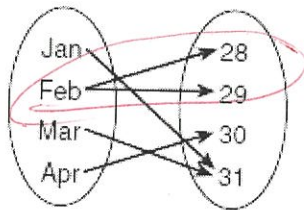
Date \_\_\_\_\_  
Period \_\_\_\_\_

1. Which relation is a function?

(1)  $\{(1,5), (2,6), (3,6), (1,7)\}$     (3)  $\{(-1,6), (2,3), (2,5), (1,7)\}$

(2)  $\{(4,7), (2,1), (-3,6), (3,4)\}$     (4)  $\{(2,2), (0,5), (5,0), (2,-1)\}$

2. A mapping is shown in the diagram below.



This mapping is

(1) A function because Feb has 2 outputs, 28 and 29

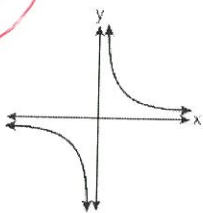
(2) A function because two inputs, Jan and Mar result in the output 31

(3) Not a function because two inputs, Jan and Mar, result in the output 31

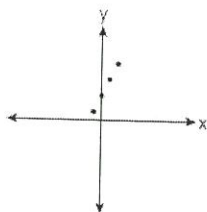
(4) Not a function because Feb has two outputs, 28 and 29

3. Which graph does *not* represent a function?

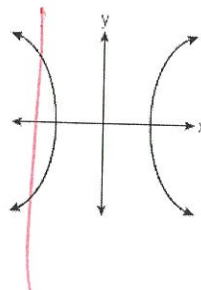
(1)



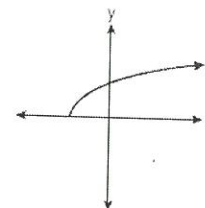
(2)



(3)



(4)



4. Compared to the graph of  $f(x) = x^2$ , the graph of  $g(x) = f(x - 2) + 3$  is the result of translating  $f(x)$

(1) 2 units up and 3 units right

(2) 2 units left and 3 units up

(3) 2 units right and 3 units up

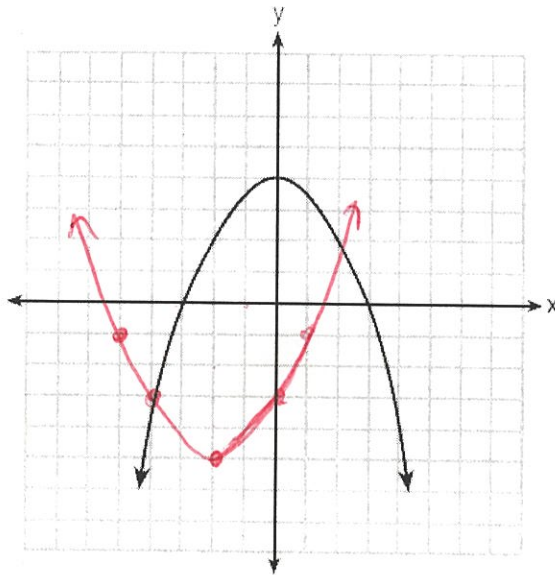
(4) 2 units down and 3 units left

5. The vertex of the parabola represented by  $f(x) = x^2 - 4x + 3$  has coordinates  $(2, -1)$ . The coordinates of the vertex of the parabola defined by  $g(x) = 3f(2x)$  is

(1)  $(4, -3)$  (2)  $(1, -3)$  (3)  $(6, -2)$  (4)  $(4, -\frac{1}{3})$

$\uparrow$   $3 \times$   $\uparrow$   $\frac{x}{2}$   $\cdot$   $\frac{2}{2} \times 3$   $(4, -3)$

6. The graph of  $p(x)$  is shown below. On the same set of axes, sketch  $q(x) = -p(x + 2) - 1$ .



1)  $x - 2$   
2)  $-y$   
3)  $y - 1$

$(-3, 0)$	$\xrightarrow{x-2}$	$(-5, 0)$	$\xrightarrow{y-1}$	$(-5, -1)$
$(-2, 2)$	$\rightarrow$	$(-4, 2)$		$(-4, -3)$
$(0, 4)$	$\rightarrow$	$(-2, 4)$	$\rightarrow$	$(-2, -5)$
$(2, 2)$		$(0, 2)$		$(0, -3)$
$(3, 0)$		$(1, 0)$		$(1, -1)$

7. If  $k(x) = 2x^2 - 3\sqrt{x}$ , then  $k(9) =$

(1) 315 (2) 307 (3) 159 (4) 153

$2(9)^2 - 3\sqrt{9}$   
 $2(81) - 3(3)$

8. The function  $f(x) = x^2 - 3x + 5$  maps the domain given by  $\{-3, 0, 2, 8\}$ . State the range of  $f(x)$ .

use table

$R = \{23, 5, 3, 45\}$

9. Algebraically determine whether the function  $j(x) = x^3 - 4x$  is odd, even, or neither.

$$j(-x) = (-x)^3 - 4(-x)$$

$$j(-x) = -x^3 + 4x \quad \text{Odd}$$

10. Which function is even?

(1)  $f(x) = x^2 - 4$  (2)  $g(x) = (x - 2)^2$  (3)  $h(x) = x^3 + 3x^2 - 1$  (4)  $j(x) = |x + 1|$

11. The inverse of  $2x + 3y = 6$  is

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

$$2y + 3x = 6$$

$$\frac{2y}{2} = \frac{-3x + 6}{2}$$

12. If  $f(x) = (x - 3)^3 + 1$ , find  $f^{-1}(x)$ .

$$x = (y - 3)^3 + 1$$

$$\sqrt[3]{x - 1} = \sqrt[3]{(y - 3)^3}$$

$$\sqrt[3]{x - 1} = y - 3$$

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

13. Given  $f(x) = 2x^2 + x - 3$  and  $g(x) = x - 1$ , find:

a)  $f(x) \cdot g(x)$

a)  $(x - 1)(2x^2 + x - 3)$

b)  $f(x) \div g(x)$

$$2x^3 + x^2 - 3x - 2x^2 - x + 3$$

$$\boxed{2x^3 - x^2 - 4x + 3}$$

c)  $f(x) - g(x)$

c)  $2x^2 + x - 3 - (x - 1)$

$$2x^2 + x - 3 - x + 1$$

$$\boxed{2x^2 - 2}$$

b)

$$x - 1 \overline{) 2x^2 + x - 3}$$

$$\underline{-2x^2 + 2x} \quad \downarrow$$

$$3x - 3$$

$$\underline{-3x + 3}$$

$$0$$

$$\boxed{2x + 3}$$

14. Determine the solution set of the equation  $x - \sqrt{x + 3} = 3$

$$(x - 3)^2 = (\sqrt{x + 3})^2$$

$$(x - 3)(x - 3) = x + 3$$

$$x^2 - 6x + 9 = x + 3$$

$$\underline{-x - 3} \quad \underline{-x - 3}$$

$$x^2 - 7x + 6 = 0$$

$$(x - 6)(x - 1) = 0$$

$$\boxed{x = 6} \quad x = 1$$

15. Simplify  $(8x^{-6}y^2)^{-\frac{1}{3}}$  and write in simplest radical form.

$$\left(\frac{1}{8x^{-6}y^2}\right)^{\frac{1}{3}} = \frac{1}{2x^{-2}y^{\frac{2}{3}}} = \frac{x^2}{2\sqrt[3]{y^2}}$$

Name \_\_\_\_\_

Date \_\_\_\_\_

Functions Review Sheet #2

Period \_\_\_\_\_

1. The graph below is of  $y = f(x)$ .

a) Find  $f(2) = 3$

b) Find  $f(-4) = 0$

c) Find all values when  $f(x) = 0$

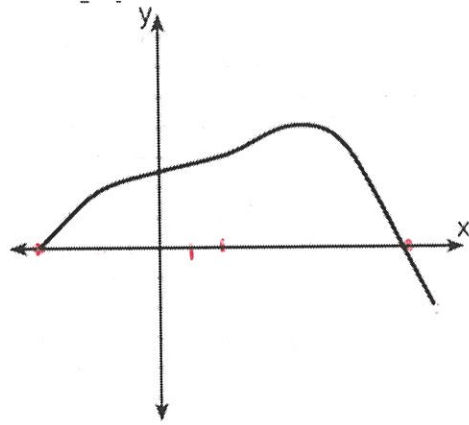
$-4, 8$

d) State the domain of  $f(x)$

$[-4, 9]$

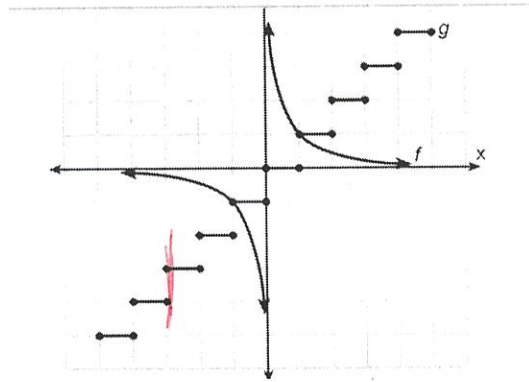
e) State the range of  $f(x)$

$[-2, 4]$



2. Which statement is true about the graphs of  $f$  and  $g$  shown below?

Vertical line test



(1) Neither  $f$  nor  $g$  is a function

(3)  $g$  is a function and  $f$  is not a function.

(2)  $f$  is a function and  $g$  is not.

(4) Both  $f$  and  $g$  are functions.

3. If the domain of  $f(x)$  is  $-4 \leq x \leq 3$  and the range of  $f(x)$  is  $-8 \leq y \leq 2$ , then state the domain and range of  $g(x)$  if  $g(x) = f(x - 2) + 5$ .

$$\begin{array}{ccc} -4 \leq x \leq 3 & & \\ +2 & & +2 \end{array}$$

$$\begin{array}{cc} \uparrow & \uparrow \\ x+2 & y+5 \end{array}$$

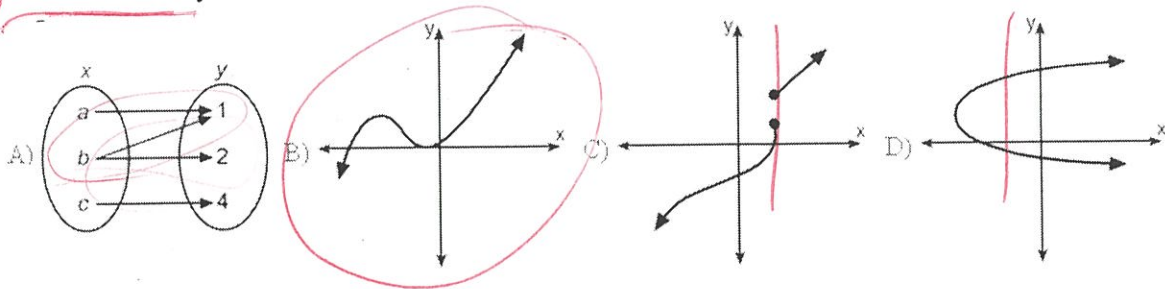
$$\begin{array}{ccc} -8 \leq y \leq 2 & & \\ +5 & & +5 \end{array}$$

$$D: -2 \leq x \leq 5$$

$$-3 \leq y \leq 7$$

Function

4. Which diagram represents a relation in which each member of the domain corresponds to one and only one member of the range?



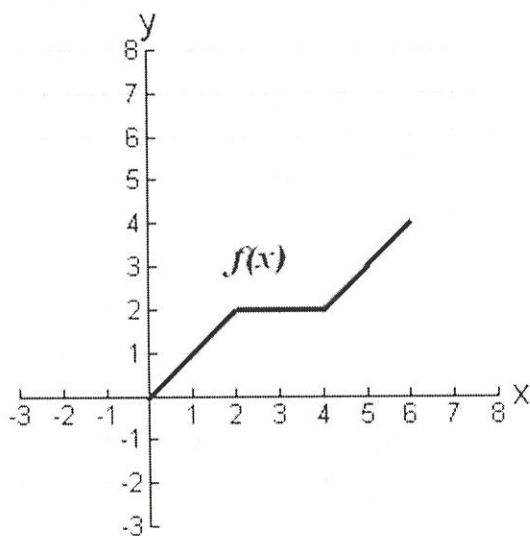
5. Given the graph of the function  $f(x)$  shown below, sketch the graphs of:

$g(x) = f(x+2) + 1$   
*left + 2*  
*up 1*

$h(x) = -f(x)$  → *reflect over x-axis*

$j(x) = \frac{1}{2}f(-x) + 4$

*reflect over y-axis*  
*vertical compression 1/2*  
*up 4*



6. Algebraically determine if the function  $f(x) = -x + x^3$  is odd, even, or neither. Justify your answer.

$f(-x) = -(-x) + (-x)^3$   
 $f(-x) = x - x^3$  Odd

7. The point  $(8, -5)$  is on the graph of  $y = f(x)$ . If the transformation of  $y = f(2x) + 7$  is applied, then the new point is

$(\frac{8}{2}, -5+7)$  *x ÷ 2* *y + 7*

(1)  $(23, -5)$

(2)  $(16, 2)$

(3)  $(11, -5)$

(4)  $(4, 2)$

8. If  $f(x) = \frac{2}{x-2}$  find the value of  $f(4) + f(2)$

$f(4) = \frac{2}{4-2} = 1$

$f(2) = \frac{2}{2-2}$  (undefined)

$32 + 8 = 40$

9. How does the graph of  $g(x) = -2f(x+5)$  change the graph of  $y = f(x)$ ?

- (1) The graph of  $y = f(x)$  is shifted 5 units right, stretched vertically by a factor of 2 and reflected about the x-axis.
- (2) The graph of  $y = f(x)$  is shifted 5 units right, stretched vertically by a factor of  $\frac{1}{2}$  and reflected about the y-axis.
- (3) The graph of  $y = f(x)$  is shifted 5 units left, stretched vertically by a factor of 2 and reflected about the x-axis.
- (4) The graph of  $y = f(x)$  is shifted 5 units left, stretched vertically by a factor of 2 and reflected about the y-axis.

10. State whether the following functions are even, odd, or neither?

*Graph on calculator*

a)  $f(x) = x^2 + x^4 - x^6$  *Even*

d)  $f(x) = x^2 + x - 1$  *Neither*

b)  $f(x) = \frac{x}{2}$  *Odd*

e)  $f(x) = \frac{1}{x}$  *Odd*

c)  $f(x) = |x| + 6$  *Even*

f)  $f(x) = x^3 - 5$  *Neither*

11. For what value of  $f(x) = 4x - 10$  does  $\frac{1}{2}f(x) = f(3x)$ ?

*$-10x = -5$   
 $x = \frac{1}{2}$*

*$2x - 5 = 12x - 10$*

12. On the grid provided, graph  $f(x) = (x - 2)^2 + 3$  over the interval  $0 \leq x \leq 4$ .

*No arrows*

- b*
- (-4, -9)*
- (-3, -6)*
- (-2, -5)*
- (-1, -6)*
- (0, -9)*

a) Find range

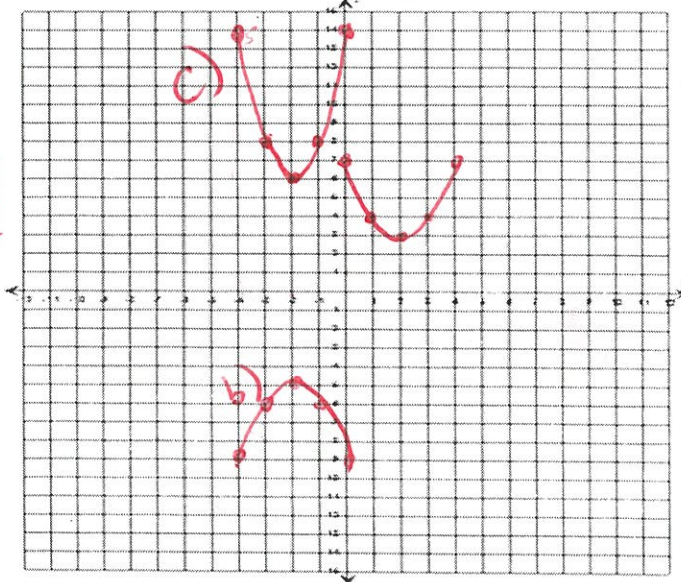
b) On the same set of axes,

graph  $g(x) = -f(x+4) - 2$

c) On the same set of axes,

graph  $h(x) = 2f(-x)$

- 1) left 4*
- 2) (r-y / x-axis)*
- 3) down 2*
- (0, 14)*
- (-1, 8)*
- (-2, 6)*
- (-3, 8)*
- (-4, 14)*
- 1) -x (r-y-axis)*
- 2) 2y (vertical stretch)*



X	Y
0	7
1	4
2	3
3	4
4	7