Name: **Key**
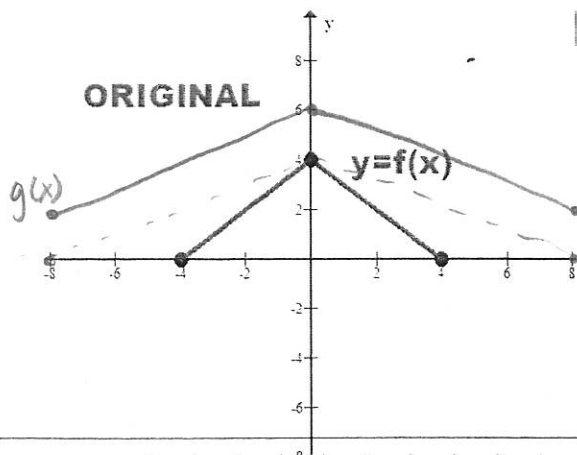
Hour: _____

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1. Use the graph of f(x) to graph g(x).

$$g(x) = f\left(\frac{1}{2}x\right) + 2$$

Be sure to know all of the transformations

• Horiz. stretch by 2
• then shift up 2

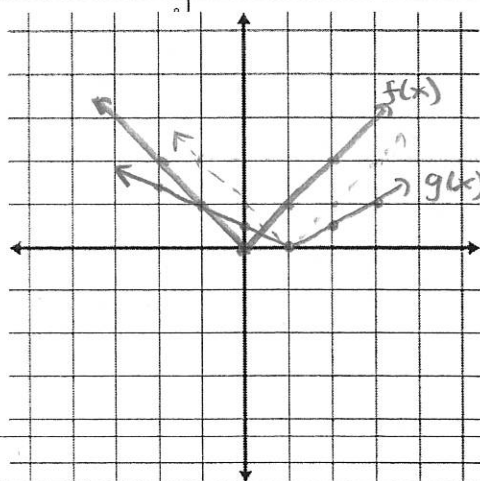**ORIGINAL**

y=f(x)

g(x)

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2. Graph $f(x) = |x|$

3. Graph $g(x) = \frac{1}{2}|x-1|$

4. Explain in words the translation from $f(x) \rightarrow g(x)$

vertical shrink by ½
right 1 unit

f(x)

g(x)

#5-8: Given $f(x) = 3x - 1$ and $g(x) = x^2 - x - 6$

5-6. Find $f - g$

$3x - 1 - (x^2 - x - 6)$

$3x - 1 - x^2 + x + 6$

$(f-g)(x) = -x^2 + 4x + 5$

Find the domain $(-\infty, \infty)$

7-8. Find $\frac{f}{g}$

$$\frac{3x-1}{x^2-x-6} = \frac{3x-1}{(x-3)(x+2)}$$

$x \neq 3 \quad x \neq -2$

Find the domain

$(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$

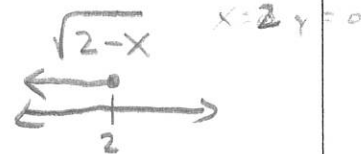**9-10:** Given that $f(x) = x^2 + 1$ and $g(x) = \sqrt{2-x}$,

Find $(f \circ g)(x)$.

$(\sqrt{2-x})^2 + 1 = 2 - x + 1$

$(f \circ g)(x) = -x + 3$

Find the domain of $(f \circ g)(x)$.

$\sqrt{2-x}$

x = 2 y = 0

$(-\infty, 2]$

2

11-12. Find $f(g(x))$ and $g(f(x))$ and determine wheather the pair of functions given below are inverses of eachother.

$f(x) = 5x + 2$ and $g(x) = \dfrac{x-2}{5}$.

$f(g(x)) = 5\left(\dfrac{x-2}{5}\right) + 2$

$x - 2 + 2$

$f(g(x)) = x$

$g(f(x)) = \dfrac{(5x+2)-2}{5} = \dfrac{5x}{5} = x$

$g(f(x)) = x$

Yes, f(x) & g(x) are inverses of eachother

13-14. Given $f(x) = (x-2)^2, x \geq 2$
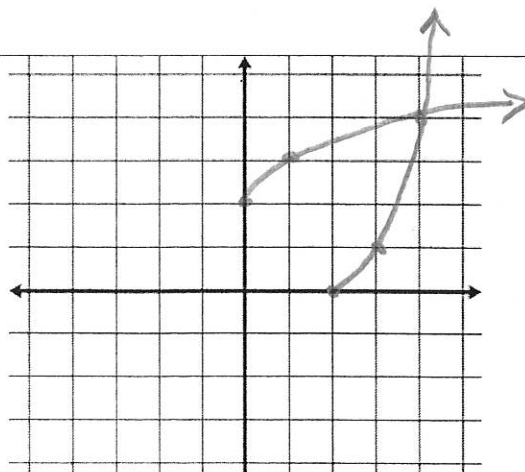
a. Find the equation for $f^{-1}(x)$

$f(x)$

X	Y
2	0
3	1
4	4

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

$f^{-1}(x)$

X	Y
0	2
1	3
4	4

b. Graph f and f^{-1} in the same rectangular coordinate system.

A. A baseball team plays in a large stadium. With a ticket price of $15, the average attendance at recent games has been 30,000. A market survey indicated that for each $1 increase in the ticket price, attendance decreases by 650.

a. Express the number of spectators at a baseball game, N, as a function of the ticket price, x.

$$30000 - 650(x-15)$$
$$30000 - 650x + 9750$$
$$N(x) = -650x + 39750$$

b. Express the revenue from a baseball game, R, as a function of the ticket price, x.

$$R(x) = -650x^2 + 39750x$$

A. A 400 room hotel can rent every one of its rooms at $120 per room. For each $1 increase in rent, two fewer rooms are rented.

a. Express the number of rooms rented, N, as a function of the rent x.

$$400 - 2(x-120)$$
$$400 - 2x + 240$$
$$N(x) = -2x + 640$$

b. Express the hotels revenue, R, as a function of the rent, x.

$$R(x) = -2x^2 + 640x$$

B. You inherit $10,000 with the stipulation that for the first year the money must be placed in two investments expected to earn 8% and 12% annual interest.

a. Express the expected interest from both investments I, as a function of the amount of money invest in the 8%, x.

$$10000 = x + y \qquad I(x) = 0.08x + 0.12y$$
$$y = 10000 - x \qquad 0.08x + 0.12(10000 - x)$$
$$0.08x + 1200 - 0.12x \qquad I(x) = -0.04x + 1200$$

b. If the total interest for the year was $1,088, how much money was invested at each rate?

$$1088 = -0.04x + 1200$$
$$-1200 \qquad -1200$$
$$-112 = -0.04x$$
$$x = 2800$$
$$y = 7200$$
$$\$2800 @ 8\% \quad \$7200 @ 12\%$$

C. You have 600 yards of fencing to enclose a rectangular field. Express the area of the field, A, as a function of one of its dimensions, x.

$$600 = 2x + 2y \qquad A = x(-x + 300)$$
$$600 - 2x = 2y$$
$$y = -x + 300 \qquad A = -x^2 + 300x$$

D. The sum of two positive numbers is 86. Write a function that models the product of the two numbers in terms of one of the numbers, x.

$$86 = x + y \qquad P = x(86 - x)$$
$$y = 86 - x \qquad P = -x^2 + 86x$$