

NAME: Key

DATE: _____

HOUR: _____

Section 7.1-7.3 Quiz Review

1) Given $f(x) = x^2 + 4x + 2$ and $g(x) = 3x + 2$ calculate each function:

a) $(f+g)(x)$ $x^2 + 4x + 2 + 3x + 2$ $x^2 + 7x + 4$	b) $(f-g)(x)$ $x^2 + 4x + 2 - (3x + 2)$ $x^2 + 4x + 2 - 3x - 2$ $x^2 + x$	c) $(f \cdot g)(x)$ $(x^2 + 4x + 2)(3x + 2)$ $3x(x^2 + 4x + 2) + 2(x^2 + 4x + 2)$ $3x^3 + 12x^2 + 6x + 2x^2 + 8x + 4$ $3x^3 + 14x^2 + 14x + 4$	d) $(f \div g)(x)$ $\frac{x^2 + 4x + 2}{3x + 2}$ $x \neq -2/3$ $3x + 2 = 0$ $3x = -2$ $x = -2/3$
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2) Given $f(x) = 3x^2 - 5x - 1$ and $g(x) = x - 3$ calculate each function:

a) $(g+f)(x)$ $x - 3 + 3x^2 - 5x - 1$ $3x^2 - 4x - 4$	b) $(g-f)(x)$ $x - 3 - (3x^2 - 5x - 1)$ $-3x^2 + 5x + 1 - 3x^2 + 5x + 1$ $-3x^2 + 6x - 2$	c) $(f \cdot g)(x)$ $(3x^2 - 5x - 1)(x - 3)$ $3x^3 - 5x^2 - x - 9x^2 + 15x + 3$ $3x^3 - 14x^2 + 14x + 3$	d) $(f \div g)(x)$ $\frac{3x^2 - 5x + 1}{x - 3}$ $x \neq 3$
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3) Given $f(x) = 4x + 5$ and $g(x) = \frac{2}{x-3}$ calculate each function:

a) $(f+g)(x)$ $4x + 5 + \frac{2}{x-3}$ $x \neq 3$	b) $(f-g)(x)$ $4x + 5 - \frac{2}{x-3}$ $x \neq 3$	c) $(f \cdot g)(x)$ $(4x + 5) \left(\frac{2}{x-3} \right)$ $\frac{8x + 10}{x-3}$	d) $(f \div g)(x)$ $\frac{4x + 5}{\frac{2}{x-3}}$ $= \frac{(4x + 5)(x-3)}{2}$ $= \frac{4x^2 - 7x - 15}{2}$
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For each pair of functions, find $f \circ g$ and $g \circ f$ if they exist:

4) $f(x) = \{(2,-1), (4,3), (5,-4)\}$ $g(x) = \{(-4,2), (-1,5), (4,6)\}$ <table border="1"> <tr><td>g</td><td>2</td><td>-1</td><td></td></tr> <tr><td></td><td>-4</td><td>5</td><td>-4</td></tr> <tr><td></td><td>4</td><td>6</td><td>*</td></tr> </table> <table border="1"> <tr><td>f</td><td>2</td><td>-1</td><td>5</td></tr> <tr><td></td><td>4</td><td>3</td><td>*</td></tr> <tr><td></td><td>5</td><td>-4</td><td>2</td></tr> </table> $g \circ f = \{(2,5), (5,2)\}$	g	2	-1			-4	5	-4		4	6	*	f	2	-1	5		4	3	*		5	-4	2	5) $f(x) = \{(0,4), (5,2)\}$ $g(x) = \{(1,0), (4,5), (6,5), (7,0)\}$ <table border="1"> <tr><td>g</td><td>1</td><td>0</td><td>4</td></tr> <tr><td></td><td>4</td><td>5</td><td>2</td></tr> <tr><td></td><td>6</td><td>5</td><td>2</td></tr> <tr><td></td><td>7</td><td>0</td><td>0</td></tr> </table> <table border="1"> <tr><td>f</td><td>0</td><td>4</td><td>5</td></tr> <tr><td></td><td>5</td><td>2</td><td>*</td></tr> </table> $g \circ f = \{(0,5)\}$	g	1	0	4		4	5	2		6	5	2		7	0	0	f	0	4	5		5	2	*
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$f \circ g = \{(-4,-1), (-1,-4)\}$

$f \circ g = \{(1,4), (4,2), (6,2), (7,0)\}$

For each of the following find $[f \circ g](x)$ and $[g \circ f](x)$:

6) $f(x) = 3x + 5$ and $g(x) = -2x + 1$

$$\begin{aligned} f(g(x)) &= g(f(x)) \\ 3(-2x+1)+5 &= -2(3x+5)+1 \\ -6x+3+5 &= -6x-10+1 \\ \boxed{-6x+8} &= \boxed{-6x-9} \end{aligned}$$

7) $f(x) = x^2 - 1$ and $g(x) = 3x$

$$\begin{aligned} f(g(x)) &= g(f(x)) \\ = (3x)^2 - 1 &= 3(x^2 - 1) \\ = \boxed{9x^2 - 1} &= \boxed{3x^2 - 3} \end{aligned}$$

8) $f(x) = x + 1$ and $g(x) = 2x^2 - 5x + 8$

$$\begin{aligned} f(g(x)) &= g(f(x)) \\ (2x^2 - 5x + 8) + 1 &= 2(x+1)^2 - 5(x+1) + 8 \\ \boxed{2x^2 - 5x + 9} &= 2(x^2 + 2x + 1) - 5x - 5 + 8 \\ &= 2x^2 + 4x + 2 - 5x + 3 \\ &= \boxed{2x^2 - x + 14} \end{aligned}$$

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

$$\begin{aligned} f \cdot g(x) &= f \cdot g(x) \\ = (-4x^2) - 5 &= \boxed{-4x^2 - 5} \\ g \cdot f(x) &= -4(x-5)^2 \\ = -4(x^2 - 10x + 25) &= \boxed{-4x^2 + 40x - 100} \end{aligned}$$

If $f(x) = 5x$, $g(x) = 2x + 3$, and $h(x) = x^2 - 4x + 7$, calculate each value:

10) $f[g(-1)]$

$$g(-1) = 2(-1) + 3 = 1$$

$$f(1) = 5(1) = \boxed{5}$$

11) $h[f(4)]$

$$f(4) = 5(4) = 20$$

$$\begin{aligned} h(20) &= 20^2 + 4(20) + 7 \\ &= 400 - 80 + 7 \\ &= \boxed{427} \end{aligned}$$

12) $[f \circ h](-3)$

$$\begin{aligned} h(-3) &= (-3)^2 - 4(-3) + 7 \\ &= 9 - 12 + 7 = \underline{4} \end{aligned}$$

$$f(4) = 5(4) = \boxed{20}$$

13) $[g \circ f](2)$

$$f(2) = 5(2) = 10$$

$$g(10) = 2(10) + 3 = \boxed{23}$$

14) $[h \circ (f \circ g)](4)$

$$g(4) = 2(4) + 3 = 11$$

$$f(11) = 5(11) = 55$$

$$h(55) = 55^2 - 4(55) + 7 = 2812$$

Find the inverse of each relation:

15) $\{(2,3), (4,-1), (5,2)\}$

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

16) $\{(-3,-1), (0,2), (3,3), (5,-2)\}$

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

Find the inverse of each function:

17) $g(x) = 4x - 9$

$$y = 4x - 9$$

$$x = \frac{y+9}{4}$$

$$x+9 = 4y$$

$$f^{-1}(x) = \frac{1}{4}x + \frac{9}{4}$$

18) $f(x) = \frac{1}{2}x + 7$

$$y =$$

$$x = \frac{1}{2}y + 7$$

$$x-7 = \frac{1}{2}y$$

$$2x-14 = y$$

$$f^{-1}(x) = 2x - 14$$

19) $h(x) = \frac{3x-1}{5}$

$$y =$$

$$x = \frac{3y-1}{5}$$

$$5x = 3y-1$$

$$5x+1 = 3y$$

$$h^{-1}(x) = \frac{5}{3}x + \frac{1}{3}$$

20) $y = -6$

$$x = -6$$

Determine if each pair of functions are inverse functions or not:

21) $f(x) = 3x - 1$ and $g(x) = \frac{x+1}{3}$

$$f \circ g(x) =$$

$$3\left(\frac{x+1}{3}\right)$$

$$= x+1$$

not
inverses

22) $f(x) = 6x + 2$ and $g(x) = \frac{1}{6}x - 1$

$$f \circ g(x) =$$

$$6\left(\frac{1}{6}x - 1\right) + 2$$

$$= x - 6 + 2$$

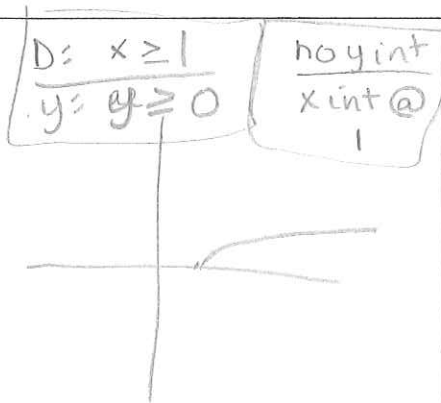
$$= x - 4$$

not
inverses

Graph each function. State the domain, range, and the x and y-intercepts. You must include a table of values as part of your work:

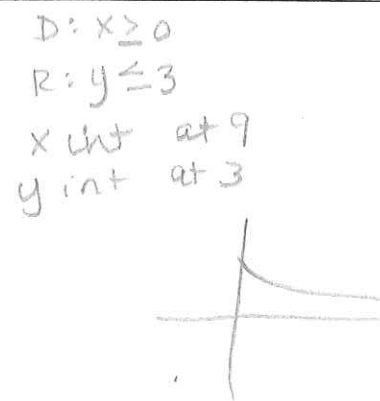
23) $y = \sqrt{x-1}$

x	y
-2	er
-1	er
0	er
1	0
2	1
3	1.4



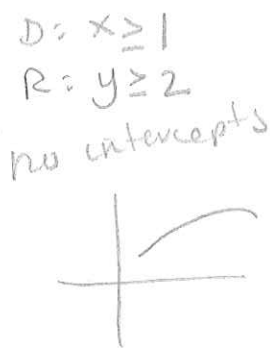
24) $y = -\sqrt{x} + 3$

x	y
-2	er
-1	er
0	3
1	2
2	1.5



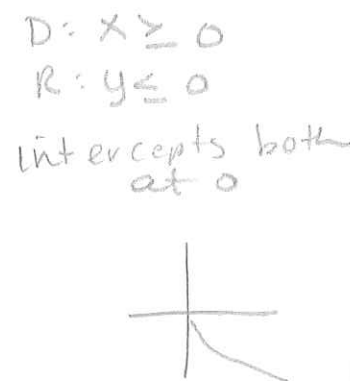
25) $y = \sqrt{2x-1} + 1$

x	y
-1	er
0	er
1	2
2	2.7
3	3.2



26) $y = -2\sqrt{x}$

x	y
-1	er
0	0
1	-2
2	-2.8
3	-3.4



Graph each inequality. You must include a table of values as part of your work.

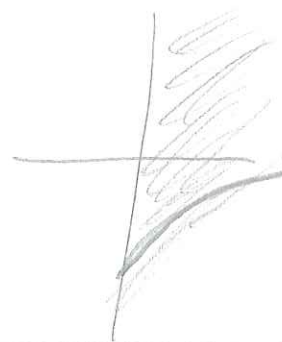
27) $y < \sqrt{x} + 2$

x	y
-3	er
-2	0
-1	1
0	1.4



28) $y \geq \sqrt{x} - 3$

x	y
-1	er
0	-3
1	-2
2	-1.5



29) $y \leq -2\sqrt{1-x}$

x	y
-3	-4
-2	-3.5
-1	-2.8
0	-2
1	0
2	er

