Advanced Algebra Name KEY

Chapter 7B Practice Test – Functions/Inverse Relations

For problems 1 – 9, $f(x) = x^2 - 2x$ and $g(x) = 2x - 4$. Perform the indicated operation, and indicate the domain for problems asking for it. Express all polynomials in standard form.

1. $f(x) + g(x)$

$x^2 - 2x + 2x - 4$

$x^2 - 4$

1. $x^2 - 4$

Domain: $(-\infty, \infty)$ or $x = \mathbb{R}$ all Real #'s

2. $f(x) - g(x)$

$x^2 - 2x + (-2x + 4)$

$x^2 - 4x + 4$

2. $x^2 - 4x + 4$

Domain: $(-\infty, \infty)$ or $x = \mathbb{R}$ all Real #'s

3. $f(x) \cdot g(x)$

$(x^2 - 2x)(2x - 4)$

$2x^3 - 4x^2 - 4x^2 + 8x \Rightarrow 2x^3 - 8x^2 + 8x$

3. $2x^3 - 8x^2 + 8x$

Domain: $(-\infty, \infty)$ or $x = \mathbb{R}$ all Real #'s

4. $\frac{f(x)}{g(x)}$ $\frac{x^2 - 2x}{2x - 4} = \frac{x(x-2)}{2(x-2)}$ $x \neq 2$

$= \frac{x}{2}$

4. $\frac{x}{2}$

Domain: $(-\infty, 2) \cup (2, \infty)$ or $x \neq 2$

5. $f(g(x))$

$f(2x - 4)$

Remember $(2x-4)(2x-4)$

$(2x - 4)^2 + -2(2x - 4)$

$4x^2 - 16x + 16 \quad -4x + 8$

$4x^2 - 20x + 24$

5. $4x^2 - 20x + 24$

Domain: $(-\infty, \infty)$ or $x = \mathbb{R}$ all Real #'s

6. $g(f(x))$

$g(x^2 - 2x)$

$2(x^2 - 2x) - 4$

$2x^2 - 4x \quad -4$

6. $2x^2 - 4x - 4$

Domain: $(-\infty, \infty)$ or $x = \mathbb{R}$ all Real #'s

7. $(g \circ f)(-2)$

$f(-2) = (-2)^2 - 2(-2)$
$4 + 4$
8

$g(f(-2))$
$g(8)$
$2(8) - 4$
$16 - 4$

7. 12

8. $f(g(2))$

$g(2) = 2(2) - 4$
$4 - 4$
0

$f(0)$
$(0)^2 - 2(0)$
0

8. 0

9. $g(f(c))$

$f(c) = (c)^2 - 2(c)$
$c^2 - 2c$

$g(c^2 - 2c)$
$2(c^2 - 2c) - 4$
$2c^2 - 4c - 4$

9. $2c^2 - 4c - 4$

10. a. Find the inverse of $f(x) = x^5 + 2$.

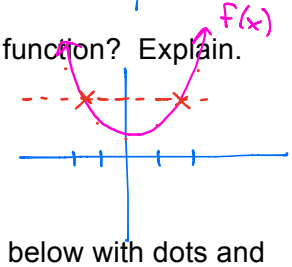
$x = y^5 + 2$
$-2 \quad -2$
$\sqrt[5]{x-2} = \sqrt[5]{y^5}$
$\sqrt[5]{x-2} = y$

10a. $f^{-1}(x) = \sqrt[5]{x-2}$

b. Is the inverse of $f(x)$ a function? Explain.

$f(x) = x^5 + 2$

x	y
-2	34
-1	3
0	2
1	3
2	34



10b. The inverse of f(x) would not be a function. It "f(x)" fails the Horizontal Line Test.

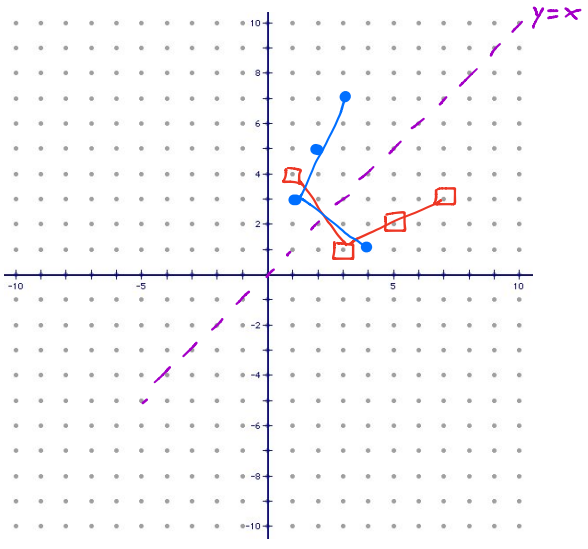
11. Graph the relation shown below with dots and its inverse with squares.

$F(x)$

x	1	2	3	4
y	3	5	7	1

$f^{-1}(x)$

x	3	5	7	1
y	1	2	3	4



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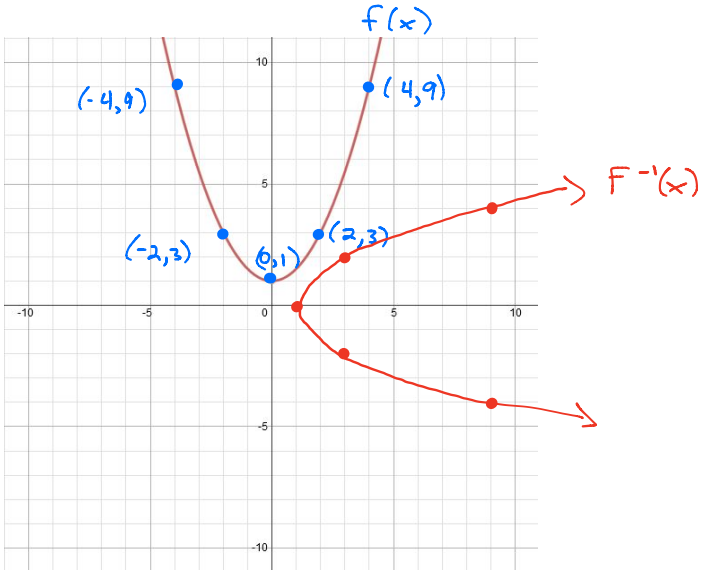
12. The graph of $f(x) = 0.5x^2 + 1$ is shown at right.



a. Graph its inverse on the same graph.

x	f(x)
-4	9
-2	3
0	1
2	3
4	9

x	$f^{-1}(x)$
9	-4
3	-2
1	0
3	2
9	4

b. Is the inverse of $f(x)$ a function? Explain.

No. f(x) fails the Horizontal Line Test AND $f^{-1}(x)$ fails the Vertical Line Test.