ALGEBRA 2
Unit 4, Test 1 Review

Name _____ Block ____

Rational Exponents

1) **Rewrite** the following using rational exponent notation.

a. $\sqrt{24}$ $24^{\frac{1}{2}}$

c. $\sqrt[7]{12^2}$ $12^{\frac{2}{7}}$

b. $\sqrt[3]{40}$ $40^{\frac{1}{3}}$

d) $\sqrt[8]{14^4}$ $14^{\frac{4}{8}}$ or $14^{\frac{1}{2}}$

2) **Rewrite** using radical notation. (2 each)

a. $21^{2/7}$ $\sqrt[7]{21^2}$

b. $5^{1/4}$ $\sqrt[4]{5^1}$

c. $3^{-2/7}$ $\frac{1}{\sqrt[7]{3^2}}$

3) **Evaluate** the expression: No negative Exponents!

a. $(\sqrt[3]{53})^{-3}$ = $\frac{1}{53}$

b. $16^{3/2}$ = 64

b. $4^{-5/2}$ = $\frac{1}{32}$

4) Find the compositions of given values if: Let $f(x) = 5x - 4$ $g(x) = 7x^2$ $h(x) = \frac{3}{x-8}$

a) $f(g(3))$

311

b) $h(f(-1))$

$\frac{-3}{17}$

c) $g(g(x))$

$343x^4$

d) $f(h(x))$

$\frac{15}{x-8} - 4$

5) Find the equation of the inverse relation, then determine if the inverse is a function:

a) $y = -2x + 6$

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

Function: (Yes) or No

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

b) $y = 6x^2 - 12$; $x \geq 0$

$y = \pm\sqrt{\frac{x+12}{6}}$

Function: Yes or (No)

D: $[-12, \infty)$

R: $(-\infty, \infty)$

c) $y = \frac{3x-2}{3}$

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

Function: (Yes) or No

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

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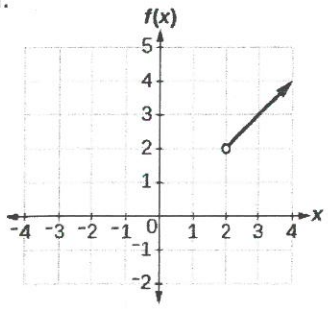
6) Name the domain and range of each graph using interval notation.

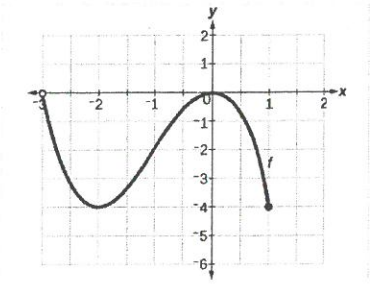
a.



D: (2,∞)

R: (2,∞)

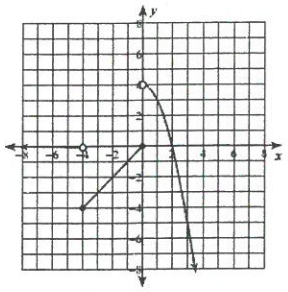
b.



D: (-3, 1]

R: [-4, 0]

c.



D: (-4) U [-4, 0] U (0, ∞)

R: (-∞, 4)

7) Circle the expression that does **not** belong in a group with the other three? Justify your reasoning, including any necessary to work to support the explanation. (a little tricky ☺)

a) $(2^a)^{1/b}$ b) $\left(\sqrt[a]{2}\right)^b$ c) $(2)^{-b/-a}$ d) $2^{a^{-1}b}$

8) Simplify: No negative exponents!

a) $x^{3/2} \cdot x^{1/2}$

x^2

b) $\sqrt[4]{\frac{n^{10}p^3}{n^2p^{-1}}}$

c) $\frac{x^{7/8}y^{11/5}}{x^{1/2}y}$

$x^{\frac{3}{8}} y^{\frac{6}{5}}$

d) $\left(x^{-2/7}\right)^{7/2}$

$\frac{1}{x}$

9) For $f(x) = 3x^{5/2}$ and $g(x) = (x)^{5/2}$ answer the following making sure to show all work.

a) $f(x) - g(x)$

$2x^{\frac{5}{2}}$

b) $f(x) + g(x)$

$4x^{\frac{5}{2}}$

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

$3x^5$

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10) $f(x) = (x-2)^3$ is shown in the table alongside.

Is the inverse of $f(x)$ a function? yes Why/why not?

x	0	1	2	3	4
y	-8	-1	0	1	8

$y = \sqrt[3]{x} + 2$

No ± on cube roots!!

11) Use composition of functions to decide if $f(x)$ and $g(x)$ are inverse functions. Show work to prove your answer.

$$f(x) = x^2 - 3 \quad and \quad g(x) = \sqrt{x+3}$$

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

$fog(x) = x$

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

$gof(x) = x$

YES

12) For $f(x) = 3x + x^2$ and $g(x) = x - 1$ answer the following making sure to show all work.

a) $f(x) - g(x)$

$2x + x^2 + 1$

b) $f(x) + g(x)$

$4x + x^2 - 1$

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

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