

NAME: Key DATE: _____ HOUR: _____

Due Thurs 4/23/15

Chapter 7 Practice Test

(You must show all work to earn full credit!!!)

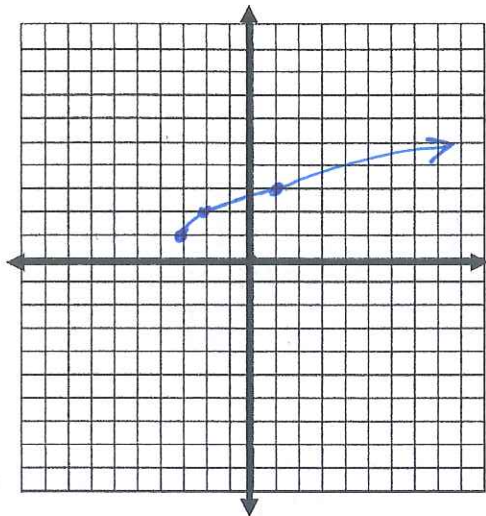
1) Given $f(x) = x^2 - 7x + 2$ and $g(x) = x + 4$, find each function value.	
a) $(f + g)(x)$ $x^2 - 7x + 2 + x + 4$ $x^2 - 6x + 6$	b) $(g - f)(x)$ $x + 4 - (x^2 - 7x + 2)$ $x + 4 - x^2 + 7x - 2$ $-x^2 + 8x + 2$
c) $(g \cdot f)(x)$ $(x + 4)(x^2 - 7x + 2)$ $x(x^2 - 7x + 2) + 4(x^2 - 7x + 2)$ $x^3 - 7x^2 + 2x + 4x^2 - 28x + 8$ $x^3 - 3x^2 - 26x + 8$	d) $\left(\frac{f}{g}\right)(x)$ $\frac{x^2 - 7x + 2}{x + 4}, x \neq -4$

2) Find the inverse of $g(x) = \frac{3x-2}{4}$ $y = \frac{3x-2}{4}$ $4 \cdot x = \frac{3y-2}{4} \cdot 4$ $4x = 3y - 2$ $\frac{4x+2}{3} = \frac{3y}{3}$ $y = \frac{4x+2}{3}$ $g^{-1}(x) = \frac{4x+2}{3}$	3) Determine if the following functions are inverses $f(x) = 2x - 3$ $g(x) = \frac{x+2}{3}$ $f[g(x)]$ $2\left(\frac{x+2}{3}\right) - 3$ $\frac{2x+4}{3} - 3$ $\neq x$ <p>* note - you need to show both = x if they are not inverses!</p>
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4) Given $f(x) = 3x - 2$, $g(x) = x^2 + 3$, and $h(x) = x^2 - 2x + 3$:	
a) find $f \circ g$ $3(x^2 + 3) - 2$ $3x^2 + 9 - 2$ $3x^2 + 7$	b) find $[h \circ (g \circ f)](2)$ $f(2) = 3(2) - 2 = 4$ $g(4) = (4)^2 + 3 = 19$ $h(19) = (19)^2 - 2(19) + 3 = 326$

5) Given the function $y = \sqrt{x+3} + 1$

a) Graph the function. Include a table of points as part of your work!



x	y
-4	err
-3	1
-2	2
1	3
0	2.7

b) Label the Domain:

$$x \geq -3$$

c) Label the Range:

$$y \geq 1$$

d) Label the x-intercept:

none

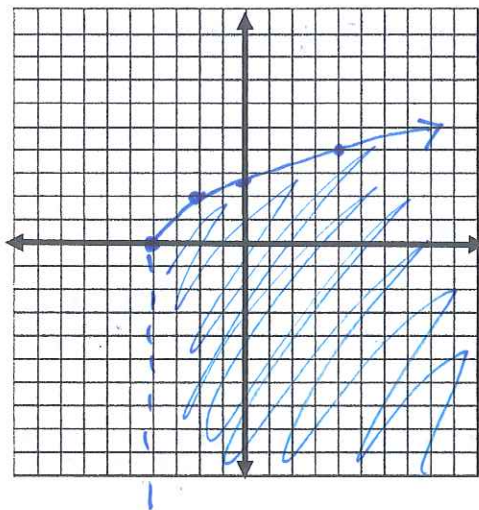
e) Label the y-intercept:

$$y = 2.7$$

6) Graph the following square root inequality. Include a table of points as part of your work!

$$y < \sqrt{2x+8}$$

x	y
-5	err
-4	0
-2	2
0	2.8
4	4



dotted line!

7) Simplify each of the following:

a) $\sqrt{\frac{36}{81}} = \frac{\sqrt{36}}{\sqrt{81}}$

$$\frac{6}{9} = \boxed{\frac{2}{3}}$$

b) $-\sqrt[4]{81x^3y^7z^{12}}$

$$= -3yz^3\sqrt[4]{x^3y^3}$$

c) $\sqrt[3]{-8a^5b^{17}}$

$$-2ab^5\sqrt[3]{a^2b^2}$$

d) $\sqrt{24} - \sqrt{54}$

$$\sqrt[4]{6} - \sqrt[9]{6}$$

$$2\sqrt{6} - 3\sqrt{6}$$

$$= \boxed{-\sqrt{6}}$$

8) Simplify each of the following:

a) $\frac{16}{-2+\sqrt{5}} \cdot \frac{(-2-\sqrt{5})}{(-2-\sqrt{5})}$

$$= \frac{-32-16\sqrt{5}}{4-5} = \frac{-32-16\sqrt{5}}{-1}$$

$$= \boxed{32+16\sqrt{5}}$$

b) $x^{-\frac{2}{5}}$

$$= \frac{1}{x^{2/5}} \cdot \frac{x^{3/5}}{x^{3/5}} = \boxed{\frac{x^{3/5}}{x}}$$

c) Write the following in exponential form:

$$\sqrt[5]{32x^4y^9}$$

$$= 32^{1/5} x^{4/5} y^{9/5} = \boxed{2 x^{4/5} y^{9/5}}$$

d) Write the following in radical form:

$$(x^2)^{5/4}$$

$$= x^{10/4} = x^{5/2} = \boxed{\sqrt{x^5}}$$

10) Solve the following radical equations. Make sure to include all required work!

a) $\sqrt{b+7} = \sqrt{2b-6}$

$$(\sqrt{b+7})^2 = (\sqrt{2b-6})^2$$

$$b+7 = 2b-6$$

$$\boxed{13 = b}$$

Check:

$$\sqrt{13+7} = \sqrt{2(13)-6}$$

$$\sqrt{20} = \sqrt{20}$$

✓

b) $\sqrt[3]{4w-1} + 7 = 10$

$$(\sqrt[3]{4w-1})^3 = (3)^3$$

$$4w-1 = 27$$

$$4w = 28$$

$$\boxed{w = 7}$$

Check:

$$\sqrt[3]{4(7)-1} + 7 = 10$$

$$\sqrt[3]{27} + 7 = 10$$

$$10 = 10$$

✓

c) $7 - (x-12)^{1/2} = 9$

$$-\sqrt{x-12} = 2$$

$$\sqrt{x-12} = -2$$

$$(\sqrt{x-12})^2 = (-2)^2$$

$$x-12 = 4$$

$$x = 16$$

Check:

$$7 - (16-12)^{1/2} = 9$$

$$7 - 4^{1/2} = 9$$

$$5 \neq 9$$

False

$\boxed{\text{no solution}}$

d) $(\sqrt{3x+1} + 2)^2 = (\sqrt{x-4})^2$

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

$$3x+1 + 4\sqrt{3x+1} + 4 = x-4$$

$$3x+5 + 4\sqrt{3x+1} = x-4$$

$$-3x-5 + 4\sqrt{3x+1} = -3x-5$$

$$(4\sqrt{3x+1})^2 = (-2x-9)^2$$

$$16(3x+1) = 4x^2 + 36x + 81$$

$$48x + 16 = 4x^2 + 36x + 81$$

$$0 = 4x^2 - 12x + 65$$

not factorable

11) Solve the following radical inequalities. Make sure to include the number line and checking numbers as part of your work:

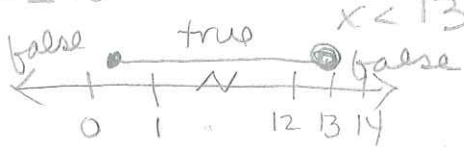
a) $3 + \sqrt{5x - 1} < 11$

$$\sqrt{5x - 1} < 8$$

$$5x - 1 \geq 0 \quad (\sqrt{5x - 1})^2 < 8^2$$

$$5x \geq 1 \quad 5x - 1 < 64$$

$$x \geq \frac{1}{5} \quad 5x < 65$$



$$x = 0$$

$$x = 10$$

$$x = 14$$

$$3 + \sqrt{-1} < 11$$

false

$$3 + \sqrt{49} < 11$$

 $10 < 11$
true

$$3 + \sqrt{69} < 11$$

 $11.3 < 11$
false

$$\frac{1}{5} \leq x < 13$$

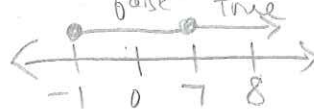
b) $\sqrt[3]{x + 1} - 3 \geq -1$

$$\sqrt[3]{x + 1} \geq 2$$

$$x + 1 \geq 0 \quad (\sqrt[3]{x + 1})^3 \geq 2^3$$

$$x \geq -1 \quad x + 1 \geq 8$$

$$x \geq 7$$



$$x = 0$$

$$x = 8$$

$$\sqrt[3]{1} - 3 \geq -1$$

 $-2 \geq -1$
false

$$\sqrt[3]{8+1} - 3 \geq -1$$

 $-0.9 \geq -1$
true

$$x \geq 7$$

12) The approximate time t in seconds that it takes an object to fall a distance of d feet is given by $t = \sqrt{\frac{d}{16}}$. Suppose a parachutist falls 11 seconds before the parachute opens. How far does the parachutist fall during this time period?

$$(11)^2 = \left(\sqrt{\frac{d}{16}}\right)^2$$

$$16 \cdot 121 = \frac{d}{16} \cdot 16$$

$$1936 = d$$

feet