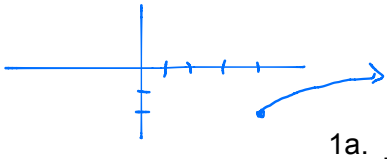
Cumulative Test Worksheet – Ch 7 Radicals

Name KEY Period

1. Given $y = \frac{1}{2}\sqrt{x-4} - 2$,



a. what is the domain? 1a. $[4, \infty)$

b. what is the range? 1b. $[-2, \infty)$

c. describe the horizontal shift. 1c. Horizontal Shift Right 4

d. describe the vertical shift. 1d. Vertical shift Down 2

2. Given $y = 3\sqrt[5]{x+1} - 3$,

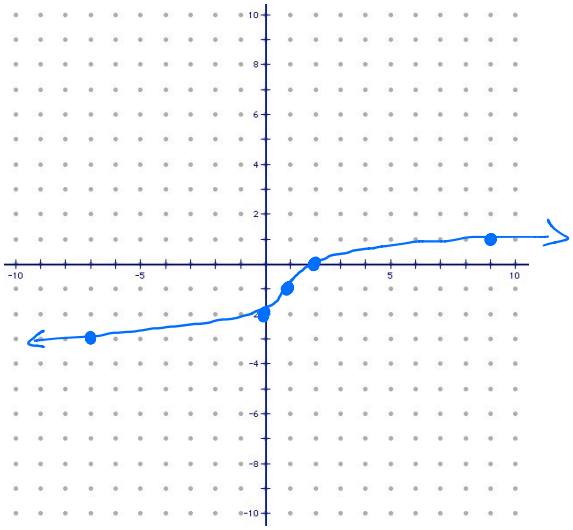
a. what is the domain? 2a. $(-\infty, \infty)$

b. what is the range? 2b. $(-\infty, \infty)$

c. describe the horizontal shift. 2c. Horizontal Shift Left 1

d. describe the vertical shift. 2d. Vertical shift Down 3

3. Graph the function $y = \sqrt[3]{x-1} - 1$ and state the domain and range of the function.



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

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

$\sqrt[3]{x}$ Parent

Right 1		x	y		Down 1
-7	+1	-8	-2	-1	-3
0	+1	-1	-1	-1	-2
1	+1	0	0	-1	-1
2	+1	1	1	-1	0
9	+1	8	2	-1	1

or

	x	y
x-1 = -8	-7	-3
x-1 = -1	0	-2
x-1 = 0	1	-1
x-1 = 1	2	0
x-1 = 8	9	1

For problems 4 – 7, solve the equation. Check for extraneous solutions.

4. $\left(\sqrt{3x}\right)^2 = \left(\sqrt{x+4}\right)^2$

$3x = x + 4$

$-x \quad -x$

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

$x = 2$

Check:

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

$\sqrt{6} = \sqrt{6}$ ✓

4. $x = 2$

5. $(x-4)^{1/2} + 6 = x$

$-6 \quad -6$

$\left((x-4)^{\frac{1}{2}}\right)^2 = (x-6)^2$

$x - 4 = x^2 - 12x + 36$

$-x + 4 \quad -x + 4$

$0 = x^2 - 13x + 40$

$0 = (x-8)(x-5)$

$x = 8$ $\quad$ $x = 5$ EXTRANEOUS

Check: $x = 8$

$(8-4)^{\frac{1}{2}} + 6 = 8$

$(4)^{\frac{1}{2}} + 6 = 8$

$2 + 6 = 8$

$8 = 8$ ✓

Check: $x = 5$

$(5-4)^{\frac{1}{2}} + 6 = 5$

$(1)^{\frac{1}{2}} + 6 = 5$

$1 + 6 = 5$

$7 \neq 5$ No!

5. $x = 8$

6. $(x-2)^{2/3} = (16)^{\frac{3}{2}}$

$x - 2 = \left(\sqrt[3]{16}\right)^3$

$x - 2 = (4)^3$

$x + 2 = 64$

$+2 \quad +2$

$x = 66$

Check:

$(66-2)^{\frac{2}{3}} = 16$

$(64)^{\frac{2}{3}} = 16$

$\left(\sqrt[3]{64}\right)^2 = 16$

$(4)^2 = 16$

$16 = 16$ ✓

6. $x = 66$

7. $3(x+3)^{3/4} = 81$

$\frac{3}{3} \quad \frac{3}{3}$

$\left((x+3)^{\frac{3}{4}}\right)^{\frac{4}{3}} = (27)^{\frac{4}{3}}$

$x + 3 = \left(\sqrt[3]{27}\right)^4$

$x + 3 = (3)^4$

$x + 3 = 81$

$-3 \quad -3$

$x = 78$

Check:

$3(78+3)^{\frac{3}{4}} = 81$

$3(81)^{\frac{3}{4}} = 81$

$3(27) = 81$

$81 = 81$ ✓

7. $x = 78$

For problems 8 – 11, simplify each radical expression. Assume all variables are positive. Do not use decimals.

8. $2\sqrt{125} - 3\sqrt{20}$

$2 \cdot \sqrt{25} \cdot \sqrt{5} \quad 3 \cdot \sqrt{4} \cdot \sqrt{5}$

$2 \cdot 5 \cdot \sqrt{5} \quad 3 \cdot 2 \cdot \sqrt{5}$

$10\sqrt{5} - 6\sqrt{5}$

$4\sqrt{5}$

8. $4\sqrt{5}$

9. $\dfrac{\sqrt[5]{32x^{10}y^{25}}}{\sqrt[5]{x^4y^8}} = \sqrt[5]{\dfrac{32x^{10}y^{25}}{x^4y^8}}$

$= \sqrt[5]{32x^6y^{17}} = 2xy^3\sqrt[5]{xy^2}$

$16 \cdot 2$

$4 \cdot 4 \cdot 2$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

9. $2xy^3\sqrt[5]{xy^2}$

10. $\left(27^{-2}x^{-9}y^{15}\right)^{\frac{-1}{3}}$

$= 27^{\frac{2}{3}} x^{\frac{9}{3}} y^{-5}$

$= \dfrac{27^{\frac{2}{3}}x^3}{y^5}$

$= \dfrac{9x^3}{y^5}$

$\left(\sqrt[3]{27}\right)^2$

$(3)^2$

9

10. $\dfrac{9x^3}{y^5}$

11. $\dfrac{(5+2\sqrt{3})}{(2-\sqrt{3})} \cdot \dfrac{(2+\sqrt{3})}{(2+\sqrt{3})}$

Multiply by the Conjugate to eliminate the radical in the denominator.

$= \dfrac{10 + 5\sqrt{3} + 4\sqrt{3} + 2\sqrt{3^2}}{4 + 2\sqrt{3} - 2\sqrt{3} - \sqrt{3^2}}$ (3 over 3^2; 3 over $\sqrt{3^2}$)

$= \dfrac{10 + 9\sqrt{3} + 6}{4 - 3}$

$= \dfrac{16 + 9\sqrt{3}}{1}$

11. $16 + 9\sqrt{3}$