

Chapter 5 Review (Radicals)

Simplify.

$$1) \sqrt{147x^2y^4} = 7xy^2\sqrt{3}$$

*Handwritten work: 147 is factored into 49 (7*7) and 3. x^2 and y^4 are simplified to x and y^2 respectively.*

$$2) \sqrt{294u^3v^3} = 7uv\sqrt{6uv}$$

*Handwritten work: 294 is factored into 49 (7*7) and 6. u^3 and v^3 are simplified to uv and u^2v^2 respectively.*

$$3) \sqrt[3]{384x^3y^8z} = 4xy^2\sqrt[3]{6y^2z}$$

Handwritten work: 384 is factored into 128 (2^7) and 3. x^3 and y^8 are simplified to xy^2 and y^2 respectively.

$$4) \sqrt[3]{189pq^4r^5} = 3qr\sqrt[3]{7pqr^2}$$

*Handwritten work: 189 is factored into 27 (3*3*3) and 7. q^4 and r^5 are simplified to qr and qr^2 respectively.*

$$5) \sqrt[3]{375x^4y^2z^4} = 5xz\sqrt[3]{3xy^2z}$$

*Handwritten work: 375 is factored into 125 (5*5*5) and 3. x^4 and z^4 are simplified to xz and z^2 respectively.*

$$6) \sqrt[5]{96x^6y^4z^6} = 2xz\sqrt[5]{3xy^4z}$$

Handwritten work: 96 is factored into 32 (2^5) and 3. x^6 and z^6 are simplified to xz and z^2 respectively.

Write each expression with rational exponents.

$$7) \sqrt[5]{2n^3} = (2n)^{3/5}$$

$$8) (\sqrt[3]{6v})^4 = (6v)^{4/3}$$

Write in Radical form. Simplify if possible.

$$9) (27n^6)^{5/3} = \sqrt[3]{27n^6}^5 = (3n^2)^5 = 3^5 n^{10} = 243n^{10}$$

Handwritten work: 27 is 3^3, n^6 is (n^2)^3. The cube root of 27n^6 is 3n^2. Raising to the 5th power gives 3^5 n^10 = 243n^10.

$$10) (64x^2)^{3/2} = \left(\sqrt{64x^2}\right)^3 = (8x)^3 = 8^3 x^3 = 512x^3$$

Handwritten work: 64 is 8^2. The square root of 64x^2 is 8x. Raising to the 3rd power gives 8^3 x^3 = 512x^3.

Describe the transformation. State the Domain and Range.

11) $y = 2\sqrt{x-1} - 2$ $(1, -2)$

Stretch
right 1
down 2

D: $x \geq 1$
R: $y \geq -2$

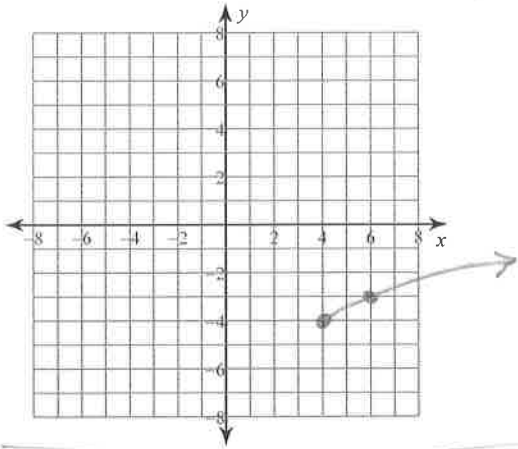
12) $y = 2\sqrt{x+6} - 1$ $(-6, -1)$

Stretch
left 6
down 1

D: $x \geq -6$
R: $y \geq -1$

Describe the transformation. Sketch a graph and state the Domain and Range.

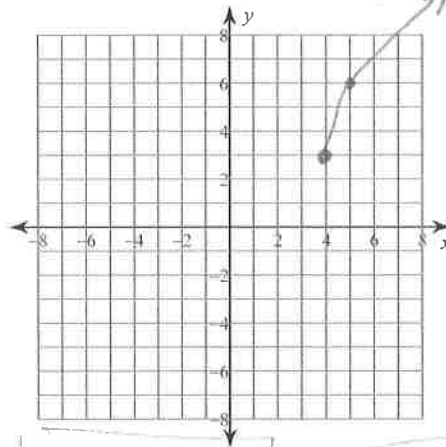
13) $y = \frac{1}{2}\sqrt{x-4} - 4$ $(4, -4)$



compression
right 4
down 4

D: $x \geq 4$
R: $y \geq -4$

14) $y = 3\sqrt{x-4} - 3$ $(4, -3)$



Stretch
right 4
down 3

D: $x \geq 4$
R: $y \geq -3$

Solve each equation. Remember to check for extraneous solutions.

15) $5 = -5 + \sqrt{2-49x}$

$2(10) = (\sqrt{2-49x})^2$

$100 = 2 - 49x$

$98 = -49x$
 $\frac{98}{-49} = \frac{-49x}{-49}$

$x = -2$

check

$5 = -5 + \sqrt{100}$

$5 = -5 + 10$

$5 = 5$

✓

16) $(\sqrt{12+4a}) = (a)^2$

$12+4a = a^2$
 $-12 -4a \quad -12 -4a$

$0 = a^2 - 4a - 12$

$0 = (a-6)(a+2)$

$a = 6$

$a = -2$

extraneous

check
 $\sqrt{12+4(6)} = 6$

$\sqrt{36} = 6$

$\sqrt{12+4(-2)} = -2$

$\sqrt{12-8} = -2$

$\sqrt{4} = -2$

$2 = -2$

$$17) (\sqrt{3p-23})^2 = (\sqrt{9-p})^2 \quad \sqrt{3(8)-23} = \sqrt{9-8}$$

$$\begin{array}{r} 3p - 23 = 9 - p \\ +p \quad +23 \quad +23 + p \\ \hline 4p = 32 \end{array}$$

$$4p = 32$$

$$p = 8$$

$$\sqrt{\quad} = \sqrt{\quad}$$

$$18) (\sqrt{6v})^2 = v^2$$

$$\begin{array}{r} 6v = v^2 \\ -6v \quad -6v \\ \hline 0 = v^2 - 6v \end{array}$$

$$0 = \frac{v^2 - 6v}{v}$$

$$0 = v(v-6)$$

$$v = 0$$

$$\begin{array}{r} v-6 = 0 \\ +6 \quad -6 \\ \hline v = 6 \end{array}$$

$$\begin{array}{l} \text{check} \\ \sqrt{0} = 0 \\ \checkmark \end{array}$$

$$\begin{array}{l} \text{check} \\ \sqrt{6(6)} = 6 \\ 6 = 6 \\ \checkmark \end{array}$$

$$19) -9 = \sqrt{33-4x} - x$$

$$\begin{array}{r} 48 \\ -6 \overline{) -8} = -14 \end{array}$$

$$\begin{array}{l} \text{check} \\ -9 = \sqrt{33-4(6)} - 6 \\ \sqrt{9} - 6 \\ 3 - 6 \\ -9 \neq -3 \end{array}$$

NO
soln

$$\begin{array}{l} -9 = \sqrt{33-4(8)} - 8 \\ -9 = 1 - 8 \\ -9 \neq -7 \end{array}$$

$$20) m = \sqrt{4m+8} - 3$$

$$\begin{array}{r} (m+3) = \sqrt{4m+8} \\ (m+3)(m+3) = 4m+8 \\ m^2 + 6m + 9 = 4m+8 \\ -4m \quad -8 \quad -4m \quad -8 \end{array}$$

$$\begin{array}{r} m^2 + 2m + 1 = 0 \\ (m+1)(m+1) = 0 \end{array}$$

$$m = -1$$

check

$$\begin{array}{r} -1 = \sqrt{4(-1)+8} - 3 \\ -1 = \sqrt{4} - 3 \\ -1 = 2 - 3 \\ -1 = -1 \\ \checkmark \end{array}$$

Solve. Remember to check your solutions.

$$21) 5 - 3n^{5/4} = -724$$

$$\begin{array}{r} 5 - 3(81)^{5/4} = -724 \\ 5 - 729 = -724 \\ -724 = -724 \\ \checkmark \end{array}$$

$$\begin{array}{r} -3n^{5/4} = -729 \\ -3 \quad -3 \end{array}$$

$$\frac{4}{5} [n^{5/4}] = [243]^{4/5}$$

$$n = 81$$

$$22) [(a-18)^{3/4}]^{4/3} = [729]^{4/3}$$

$$\begin{array}{r} a - 18 = 81 \\ +18 \quad +18 \\ \hline a = 99 \end{array}$$

$$\begin{array}{r} (99-18)^{3/4} = 729 \\ 729 = 729 \\ \checkmark \end{array}$$

$$23) [243]^{3/5} = [(-5-4k)^{5/3}]^{3/5}$$

$$\begin{array}{r} 27 = -5 - 4k \\ +5 \quad +5 \end{array}$$

$$\begin{array}{r} 32 = -4k \\ -8 = k \end{array}$$

$$243 = (-5-4(-8))^{5/3}$$

$$(-5+32)$$

$$\begin{array}{r} 243 = (27)^{5/3} \\ 243 = 243 \\ \checkmark \end{array}$$

$$24) 2\sqrt{x-4} - 11 \leq 7$$

$$\begin{array}{r} 2\sqrt{x-4} \leq 18 \\ \hline \sqrt{x-4} \leq 9 \end{array}$$

$$(\sqrt{x-4})^2 \leq (9)^2$$

$$\begin{array}{r} x-4 \leq 81 \\ +4 \quad +4 \end{array}$$

$$x \leq 85$$

$$\begin{array}{r} x-4 \geq 0 \\ x \geq 4 \end{array}$$

$$4 \leq x \leq 85$$

$$25) 7\sqrt{x-4} - 5 > 16$$

$$\begin{array}{r} 7\sqrt{x-4} > 21 \\ \hline \sqrt{x-4} > 3 \end{array}$$

$$(\sqrt{x-4})^2 > (3)^2$$

$$x-4 > 9$$

$$x > 13$$

$$\begin{array}{r} x-4 \geq 0 \\ x \geq 4 \end{array}$$

$$x > 13$$