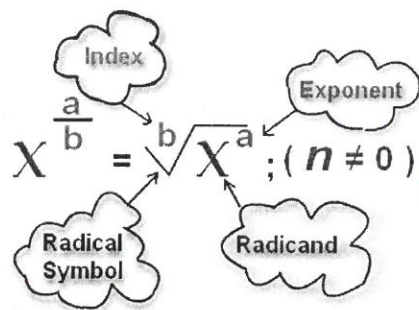


Extra Practice for Unit 3 Quiz 1

Remember: An expression containing a rational exponent can be written in an equivalent radical form.



Part A: Rewrite each of the following expressions in radical form.

$x^{\frac{3}{2}}$ $\sqrt{x^3}$ $\sqrt{x \cdot x \cdot x}$	$(-27)^{\frac{2}{3}}$ $\sqrt[3]{(-27)^2}$ $(\sqrt[3]{-27})^2 = (-3)^2 = 9$	$(16x)^{\frac{5}{4}}$ $\sqrt[4]{16^5 x^5}$ $(\sqrt[4]{16})^5 \cdot \sqrt[4]{x^5} = 2^5 \cdot \sqrt[4]{x^5} = 32 \sqrt[4]{x^5}$	$y^{-9/8}$ $\frac{1}{\sqrt[8]{y^9}} = \frac{1}{y^{9/8}}$
$2a^{\frac{1}{4}}$ $\sqrt[4]{2a}$	$4^{\frac{-7}{2}}$ $\frac{1}{\sqrt{4^7}} = \frac{1}{(\sqrt{4})^7} = \frac{1}{2^7} = \frac{1}{128}$	$(3^5)^5 = 3^a$ 9	$x^{1.2} = x^{12/10} = x^{6/5}$ $\sqrt[5]{x^6} = x^{6/5}$

Part B: Rewrite these radical expressions as expressions with rational exponents.

$\sqrt[5]{2}$ $2^{1/5}$	$(\sqrt[3]{6})^5$ $6^{5/3}$	$(\sqrt{5})^7$ $5^{7/2}$
$\sqrt{7}$ $7^{1/2}$	$(\sqrt[4]{9^3})$ $9^{3/4}$	$(\sqrt[7]{3x})^2$ $3^{2/7} x^{2/7}$

Part C: Write your final answer as a simplified radical. (Hint: if you convert the radical expressions into expressions with rational exponents, you CAN multiply or divide them! Give it a try ☺)

1. $\frac{12\sqrt[3]{y}}{4\sqrt{y}} = 3y^{1/3 - 1/2} = 3y^{2/6 - 3/6} = 3y^{-1/6} = \frac{3}{\sqrt[6]{y}}$

2. $\left(\frac{\sqrt[3]{a^2}}{\sqrt{b}}\right)^{-6} = \left(\frac{a^{2/3}}{b^{1/2}}\right)^{-6} = \frac{a^{-12/3}}{b^{-6/2}} = \frac{a^{-4}}{b^{-3}} = \frac{b^3}{a^4}$

3. $(2\sqrt[4]{a})^3 \cdot \sqrt{a^3} = 2^3 a^{3/4} \cdot a^{3/2} = 8 a^{3/4 + 6/4} = 8 a^{9/4} = 8\sqrt[4]{a^9}$

4. $\sqrt[4]{x^{12}} \cdot \sqrt{y^{-2}} = x^{12/4} y^{-2/2} = x^3 y^{-1} = \frac{x^3}{y}$

5. $\frac{\sqrt{64x^3}}{\sqrt[3]{512x^9}} = \frac{64^{1/2} x^{3/2}}{512^{1/3} x^{9/3}} = \frac{8x^{3/2}}{8x^3} = x^{3/2 - 3} = x^{-3/2} = \frac{1}{x\sqrt{x}}$

6. $\sqrt[4]{625x^8} = \sqrt[4]{625} \sqrt[4]{x^8} = 5x^2$

7. $\sqrt[7]{x^2} \cdot \sqrt[4]{x^3} = x^{2/7} \cdot x^{3/4} = x^{8/28 + 21/28} = x^{29/28} = \sqrt[28]{x^{29}}$

8. $\frac{1}{\sqrt[3]{-27x^9}} = \frac{1}{\sqrt[3]{-27} \sqrt[3]{x^9}} = \frac{1}{-3x^3} = -\frac{1}{3x^3}$

9. $(\sqrt{x} \cdot \sqrt[3]{y^2})^{-6} = (x^{1/2} \cdot y^{2/3})^{-6} = x^{-6/2} y^{-12/3} = x^{-3} y^{-4} = \frac{1}{x^3 y^4}$

odds

* = do together with small boards in class

Part D: Simplify and rewrite without negative exponents.

- 1) $6 \cdot c^3 \cdot d^{-2} = \frac{6c^3}{d^2}$
- * 2) $6x^4 x^{-10} = 6x^{-6} = \frac{6}{x^6}$
- * 3) $(2^0 \cdot x^{-3})^4 = (1 \cdot x^{-3})^4 = 1^4 \cdot x^{-12} = \frac{1}{x^{12}}$
- * 4) $\frac{a^{12} b^{-3}}{a^5 b^5} = \frac{a^{12-5} b^{-3-5}}{a^7 b^8} = \frac{a^7}{b^8}$
- 5) $\left(\frac{5x^{13} y^5 z^2}{3 \cdot 5^2}\right)^0 = 1$
- 6) $(g^3 \cdot g^{-2})^4 = (g^3)^4 (g^{-2})^4 = g^{12} g^{-8} = g^{12-8} = g^4$
- 7) $\left(\frac{4c^{-5}}{8d^0}\right)^3 = \left(\frac{c^{-5}}{2}\right)^3 = \frac{c^{-15}}{8} = \frac{1}{8c^{15}}$
- * 8) $\left(\frac{x^{-8}}{y^{11}}\right)^{-2} = \frac{x^{16}}{y^{-22}} = \frac{x^{16} y^{22}}{1}$
- 9) $\frac{(2x^3) \cdot (x^4)^2}{8x^{11}} = \frac{2x^3 \cdot x^8}{8x^{11}} = \frac{2x^{11}}{8x^{11}} = \frac{1}{4}$
- 10) $(2x^2 y^3)^5 = 2^5 x^{10} y^{15} = 32x^{10} y^{15}$
- 11) $\frac{-3x^2}{y^6} = \frac{-3x^2}{y^6}$
- * 12) $(3x)^{-2} (x^2) = \frac{x^2}{(3x)^2} = \frac{x^2}{9x^2} = \frac{1}{9}$
- 13) $\frac{2xy^2}{8x^2 y} = \frac{xy^2}{4x^2 y} = \frac{y}{4x}$
- 14) $3^{-2} 2^4 x^3 x = \frac{16x^4}{3^2} = \frac{16x^4}{9}$
- 15) $(-2xy)^4 = (-2)^4 x^4 y^4 = 16x^4 y^4$

Part E: Graph each of the functions on graph paper. State the domain and range in interval notation. Then describe how the function changed from the parent graph.

* Graph by hand *

1. $y = \sqrt{x+4}$ translated left 4	2. $y = -\sqrt{x-3}$ refl over x-axis + translated down 3	3. $y = 3 + \sqrt{x+3}$ translated left 3 + up 3
4. $y = -\sqrt{x-1} - 3$ refl over x-axis translated right 1, down 3	5. $y = \sqrt{x}$ parent already !!	6. $y = \sqrt{x-2} + 1$ translated right 2 + up 1
7. $y = -\sqrt[3]{x}$ reflected over x-axis	8. $y = 3\sqrt[3]{x+5}$ vertical stretch by 3, translated left 5	9. $y = \sqrt[3]{x-2}$ translated down 2
10. $y = -\sqrt[3]{x+3}$ refl over x-axis and translated left 3	11. $y = \sqrt[3]{x+2} + 5$ translated left 2 + up 5	12. $y = \sqrt[3]{x+2} + 5$ translated left 2 + up 5

13. How would each of the following graphs be transformed in relation to the parent graph?

- a) $y = \sqrt[3]{x-3}$ translated right 3
- b) $y = \sqrt[3]{x+4}$ translated left 4
- c) $y = -3\sqrt[3]{x}$ reflected over x-axis, vertical stretch by 3.
- d) $y = \sqrt[3]{x} + 5$ translated up 5
- e) $y = \sqrt[3]{x} - 6$ translated down 6
- f) $y = 3\sqrt[3]{x-2} + 7$ vertical stretch by 3, translated right 2 + up 7