

Unit 5 Quiz – **SHOW ALL STEPS IN YOUR SOLVING AND SIMPLIFICATION!**

1. Simplify. Your answers should have only positive exponents and no fractional exponents in the denominator.

$$\text{a) } (3b)^2 = 3^2 b^2 = 9b^2$$

$$\text{b) } 2(x^4)^{-2} = 2 \cdot x^{-8} = \frac{2}{x^8}$$

2. Rewrite using rational exponents and simplify.

$$\text{d) } \sqrt[3]{64} = 64^{\frac{1}{3}} = 4$$

$$\text{e) } \sqrt[6]{(27x)^2} = (27^2 x^2)^{\frac{1}{6}} = 27^{\frac{1}{3}} x^{\frac{1}{3}} = 3x^{\frac{1}{3}}$$

$$\text{f) } \sqrt[5]{32 \cdot x^{10}} = 32^{\frac{1}{5}} x^{10 \cdot \frac{1}{5}} = 2x^2$$

$$\text{g) } \frac{\sqrt[4]{162x^2}}{\sqrt[4]{2x}} = \sqrt[4]{\frac{162x^2}{2x}} = \sqrt[4]{81x} = (81x)^{\frac{1}{4}} = 3x^{\frac{1}{4}}$$

3. Simplify the expressions using properties of exponents. Your answer will contain only positive exponents without fractional exponents in the denominator.

$$\text{h) } \frac{x^{-\frac{1}{2}}}{x^5} = \frac{1}{x^5 x^{\frac{1}{2}}} \cdot \frac{x^{\frac{1}{2}}}{x^{\frac{1}{2}}} = \frac{x^{\frac{1}{2}}}{x^6}$$

$$i) \left( \frac{a^{-\frac{1}{2}} b^3}{a^{\frac{5}{4}} \cdot b^{-\frac{1}{3}}} \right)^3$$

$$= \frac{a^{-\frac{3}{2}} b^9}{a^{\frac{15}{4}} b^{-\frac{3}{3}}}$$

$$a^{-\frac{6}{4} - \frac{15}{4}} b^{\frac{27}{3} - \frac{3}{3}}$$

$$a^{-\frac{21}{4}} b^{\frac{30}{3}}$$

$$\frac{b^{10}}{a^{\frac{21}{4}}} \cdot \frac{a^{\frac{3}{4}}}{a^{\frac{3}{4}}}$$

$$\frac{a^{\frac{3}{4}} b^{10}}{a^6}$$

simplify inside first?

$$\left( \frac{b^{\frac{1}{3}} b^3}{a^{\frac{1}{2}} a^{\frac{5}{4}}} \right)^3$$

$$\left( \frac{b^{\frac{10}{3}}}{a^{\frac{7}{4}}} \right)^3$$

$$\frac{b^{\frac{30}{3}} \cdot a^{\frac{3}{4}}}{a^{\frac{21}{4}} a^{\frac{3}{4}}}$$

$$\frac{a^{\frac{3}{4}} b^{10}}{a^6}$$

4. Write one expression using both negative and fractional exponents that simplifies to **81**.

$$\left( \frac{1}{3^8} \right)^{-\frac{1}{2}} = 3^{8 \cdot \frac{1}{2}} = 3^4 = 81$$

OR

$$\left( \frac{1}{9^{-4}} \right)^{\frac{1}{2}} = 9^{4 \cdot \frac{1}{2}} = 9^2 = 81$$

Unit 5 Quiz – **SHOW ALL STEPS IN YOUR SOLVING AND SIMPLIFICATION!**

1. Simplify. Your answers should have only positive exponents and no fractional exponents in the denominator.

a)  $(2b)^3 = 2^3 b^3$   
 $8b^3$

b)  $3(x^4)^{-3} = 3x^{-12}$   
 $\frac{3}{x^{12}}$

2. Rewrite using rational exponents and simplify.

d)  $\sqrt[4]{81} = 81^{\frac{1}{4}} = 3$

e)  $\sqrt[4]{(16x^2)^2} = \sqrt[4]{16^2 x^2}$   
 $(16^2 x^2)^{\frac{1}{4}}$   
 $16^{\frac{1}{2}} x^{\frac{1}{2}}$   
 $4x^{\frac{1}{2}}$

f)  $\sqrt[3]{216 \cdot p^6} = (216 p^6)^{\frac{1}{3}}$   
 $216^{\frac{1}{3}} p^2$   
 $6p^2$

g)  $\frac{\sqrt[5]{96y^2}}{\sqrt[5]{3y}} = \sqrt[5]{\frac{96y^2}{3y}}$   
 $\sqrt[5]{32y}$   
 $32^{\frac{1}{5}} y^{\frac{1}{5}}$   
 $2y^{\frac{1}{5}}$

3. Simplify the expressions using properties of exponents. Your answer will contain only positive exponents without fractional exponents in the denominator.

h)  $\frac{x^{-\frac{1}{2}}}{x^3} = \frac{1}{x^3 x^{\frac{1}{2}}} \cdot \frac{x^{\frac{1}{2}}}{x^{\frac{1}{2}}} = \frac{x^{\frac{1}{2}}}{x^4}$

$$i) \left( \frac{x^{-\frac{1}{3}} y^2}{x^{\frac{3}{4}} \cdot y^{-\frac{1}{2}}} \right)^2$$

① power rule & divide

$$\frac{x^{-\frac{8}{12}} y^{\frac{4}{2}}}{x^{\frac{6}{4}} y^{-\frac{2}{2}}}$$

$$x^{-\frac{8}{12} - \frac{6}{12}} y^{\frac{8}{2} - -\frac{2}{2}}$$

$$x^{-\frac{14}{12}} y^{\frac{10}{2}}$$

$$\frac{y^5}{x^{\frac{14}{12}} \cdot x^{\frac{10}{12}}}$$

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

① Neg rule & multiply

$$\left( \frac{y^{\frac{1}{2}} y^{\frac{4}{2}}}{x^{\frac{3}{4}} x^{\frac{1}{2}}} \right)^2$$

$$\left( \frac{y^{\frac{5}{2}}}{x^{\frac{13}{12}}} \right)^2$$

$$\frac{y^{\frac{10}{2}} x^{\frac{10}{12}}}{x^{\frac{26}{12}} x^{\frac{10}{12}}}$$

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

4. Write one expression using both negative and fractional exponents that simplifies to 64.

$$\left( \frac{1}{84} \right)^{-\frac{1}{2}} = \frac{1^{-\frac{1}{2}}}{8^{-2}} = \frac{1}{8^{-2}} = 8^2 = 64$$