

#### 4.4 Rational Exponents

Name \_\_\_\_\_

Write the following expressions using rational exponents only. Use negative exponents in #3, 4.

1.  $\sqrt{7}$

2.  $\sqrt[3]{5}$

3.  $\frac{1}{\sqrt{5}}$

4.  $\frac{1}{\sqrt[3]{7}}$

Write the following expressions using radical notation only. Simplify where possible.

5.  $25^{\frac{1}{2}}$

6.  $8^{\frac{1}{3}}$

7.  $4y^{\frac{2}{3}}$

8.  $10x^{\frac{1}{5}}$

Answers: 1.  $7^{\frac{1}{2}}$ ; 3.  $5^{-\frac{1}{2}}$ ; 5. 5; 7.  $4\sqrt[3]{y^2}$

Simplify the expressions.

9.  $\left(\frac{1}{9}\right)^{\frac{1}{2}}$

10.  $\left(\frac{1}{8}\right)^{\frac{1}{3}}$

11.  $4^{\frac{3}{2}}$

12.  $8^{\frac{2}{3}}$

13.  $(x^4)^{\frac{1}{2}}$

14.  $(x^9)^{\frac{1}{3}}$

15.  $(a^6)^{\frac{2}{3}}$

16.  $(m^8)^{\frac{3}{4}}$

Answers: 9.  $\frac{1}{3}$ ; 11. 8; 13.  $x^2$ ; 15.  $a^4$

Simplify the expressions.

17.  $x^{\frac{1}{2}} \cdot x^{\frac{3}{2}}$

18.  $a^{\frac{1}{4}} \cdot a^{\frac{3}{4}}$

19.  $y^{\frac{7}{5}} \cdot y^{-\frac{1}{2}}$

20.  $3^{-\frac{3}{4}} \cdot 3^{\frac{1}{2}}$

21.  $\frac{x^3}{x^{\frac{1}{2}}}$

22.  $\frac{a^4}{a^{\frac{1}{3}}}$

23.  $\sqrt[4]{x^2}$

24.  $\sqrt[12]{x^4 y^4}$

Answers: 17.  $x^2$ ; 19.  $y^{\frac{9}{10}}$ ; 21.  $x^{\frac{5}{2}}$ ; 23.  $\sqrt{x}$

Write as a single radical.

25.  $\sqrt[3]{2} \cdot \sqrt{2}$

26.  $\sqrt[3]{x} \cdot \sqrt{x}$

27.  $\sqrt[3]{b^2} \cdot \sqrt[4]{b}$

28.  $\sqrt[4]{a^2} \cdot \sqrt[5]{a}$

29.  $\frac{\sqrt{x}}{\sqrt[3]{x}}$

30.  $\frac{\sqrt[3]{x}}{\sqrt[5]{x}}$

31.  $\sqrt[3]{\sqrt{x}}$

32.  $\sqrt{\sqrt[3]{a^4}}$

Answers: 25.  $\sqrt[6]{32}$ ; 27.  $\sqrt[12]{b^{11}}$ ; 29.  $\sqrt[6]{x}$ ; 31.  $\sqrt[6]{x}$