Simplify Expressions Using the Laws of Exponents

1. Simplify each of the following expressions

$$2^{\frac{1}{4}} \cdot 2^{\frac{11}{4}}$$

2. Simplify each of the following expressions

$$\frac{5^{\frac{9}{2}}}{5^{\frac{5}{2}}}$$

3. Simplify each of the following expressions

$$5^{\frac{-7}{3}} \cdot 5^{\frac{2}{5}}$$

4. Simplify each of the following expressions

$$\frac{y^{\frac{1}{3}}}{y^{\frac{5}{12}}}$$

5. Simplify each of the following expressions

$$\left(16^{\frac{7}{12}}\right)^{\frac{6}{7}}$$

6. Simplify each of the following expressions

$$\left(25^{\frac{-1}{3}} \cdot 5^{\frac{11}{3}}\right)^{-2}$$

7. Simplify each of the following expressions

$$\left(a^{\frac{5}{2}} \cdot b^{\frac{-1}{3}}\right)\left(a^{-3} \cdot b^{\frac{10}{3}}\right)$$

8. Simplify each of the following expressions

$$\left(\frac{36m^{\frac{1}{4}}n}{m^{-3}n^{\frac{8}{5}}}\right)^{\frac{1}{2}}$$

9. Use rational exponents to simplify each radical. Assume all variables are positive.

$$\sqrt[12]{25^6}$$

10. Use rational exponents to simplify each radical. Assume all variables are positive.

$$\sqrt{36x^{10}y^{18}}$$

11. Use rational exponents to simplify each radical. Assume all variables are positive.

$$\frac{\sqrt[3]{y^5}}{\sqrt[5]{y}}$$

12. Use rational exponents to simplify each radical. Assume all variables are positive.

$$\sqrt[5]{\sqrt{x^5}}$$

13. Use rational exponents to simplify each radical. Assume all variables are positive.

$$\sqrt[3]{7} \cdot \sqrt[7]{49}$$

14.

Simplify

$$5x^{\frac{3}{2}} + 2x^{\frac{1}{2}}(3x-5)$$

by factoring out

$$x^{\frac{1}{2}}$$

15.

Simplify

$$2(x+3)^{\frac{1}{3}}(5x+2) + 9(x+3)^{\frac{4}{3}}$$

by factoring out

$$(x+3)^{\frac{1}{3}}$$