DIGITAL

NAME

Module 17 Simplifying Radical Expressions
Lesson 4 Dividing Radicals

independent practice

Simplify each radical expression.

1. $\sqrt{\dfrac{49}{81}}$

7/9

2. $\sqrt{\dfrac{64}{25}}$

8/5

3. $\dfrac{\sqrt{36}}{\sqrt{6}}$

√6

4. $\dfrac{\sqrt{16}}{\sqrt{x^2}}$

4/|x|

5. $\dfrac{\sqrt{y^2}}{\sqrt{25}}$

|y|/5

6. $\dfrac{\sqrt{51}}{\sqrt{17}}$

√3

7. $\dfrac{\sqrt{16}}{\sqrt{4}}$

2

8. $\sqrt{\dfrac{27}{3}}$

3

9. $\dfrac{\sqrt{3}}{\sqrt{5}}$

√15/5

10. $\sqrt{\dfrac{6}{7}}$

√42/7

11. $\dfrac{\sqrt{5}}{\sqrt{14}}$

√70/14

12. $\dfrac{\sqrt{6}}{\sqrt{11}}$

√66/11

13. $\sqrt{\dfrac{7}{8}}$

√14/4

14. $\dfrac{1}{\sqrt{18}}$

√2/6

15. $\dfrac{2}{\sqrt{8}}$

√2/2

16. $\sqrt{\dfrac{4}{18}}$

√2/3

17. $\dfrac{3}{\sqrt{6}+\sqrt{2}}$

(3√6 − 3√2)/4

18. $\dfrac{8}{\sqrt{7}-\sqrt{5}}$

4√7 + 4√5

19. $\dfrac{5}{\sqrt{4}+\sqrt{3}}$

10 − 5√3

20. $\dfrac{9}{\sqrt{11}-\sqrt{5}}$

(3√11 + 3√5)/2

Journal

1. Explain how to write the radical expression $\dfrac{3}{\sqrt{8}}$ in simplest form.
2. Define and demonstrate the Quotient Property of Square Roots.
3. Which of the two values, $\dfrac{\sqrt{11}}{2}$ or $\dfrac{\sqrt{22}}{2}$, is $\dfrac{\sqrt{11}}{\sqrt{2}}$ in simplest form? Justify your answer.
4. Describe what criteria must be met for a radical expression to be in simplest form.
5. Describe the process of writing the expression $\dfrac{2}{\sqrt{6}+\sqrt{3}}$ in simplest form.

Cumulative Review

1. Find the restricted value(s) in the domain of the expression $\dfrac{12}{x^2-4}$.

   The variable x cannot equal −2 or 2.

2. Solve for m: $27m = 45 \cdot 3$ **m = 5**

3. Reduce the following expression to lowest terms: $\dfrac{6a+18}{3a^2+9a}$.

   $\dfrac{2}{a}$; a ≠ 0; a ≠ −3

4. Simplify: $\frac{24x^2y^3}{5z^3} \cdot \frac{15x^2z^2}{8xy}$ $\dfrac{9x^3y^2}{z}$

5. Solve for n: $n - 12 = \frac{n}{3}$. **$n = 18$**

6. Solve for x: $\frac{x}{3} = \frac{15}{5}$. **$x = 9$**

7. The variable y varies directly as x: y is 7 when x is 42. Find x when y is 14.

$x = 84$

8. The variable y varies inversely as x: y is 6 when x is 35. Find y when x is 15.

$y = 14$

9. Last week Sue worked 24 hours and earned $144. How much money does she earn per hour?

Sue earns $6 per hour.

10. The time needed to drive from Little Rock to New York City varies inversely as the speed traveled. If the trip takes 25 hours at 50 miles per hour, how long will it take traveling at 75 miles per hour?

$16\frac{2}{3}$ hours or 16 hours 40 minutes

Possible Journal Answers

1. To write the value $\frac{3}{\sqrt{8}}$ in simplest form, eliminate the radical in the denominator. Multiplying the expression by $\frac{\sqrt{2}}{\sqrt{2}}$ is equivalent to multiplying by one; anything times one is itself. So $\frac{3}{\sqrt{8}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3 \cdot \sqrt{2}}{\sqrt{8} \cdot \sqrt{2}} = \frac{3\sqrt{2}}{\sqrt{16}}$, which is $\frac{3\sqrt{2}}{4}$ in simplest form.

2. The Quotient Property of Square Roots states the square root of a quotient equals the square root of numerator of the radicand divided by the square root of the denominator of the radicand. For instance, $\sqrt{\frac{49}{65}} = \frac{\sqrt{49}}{\sqrt{65}}$.

3. Multiply both the numerator and the denominator by $\sqrt{2}$. The value $\frac{\sqrt{11}}{\sqrt{2}}$ is equal to $\frac{\sqrt{11}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$, which simplifies to $\frac{\sqrt{22}}{2}$.

4. A radical in simplest form must contain no perfect square factors under a radical sign, must have no fractions under a radical sign, and must contain no radicals in the denominator.

5. Eliminate the radicals in the denominator. Multiply the numerator and the denominator by the conjugate of the denominator. The conjugate of $\sqrt{6} + \sqrt{3}$ is $\sqrt{6} - \sqrt{3}$. The expression becomes $\frac{2\sqrt{6} - 2\sqrt{3}}{(\sqrt{6} + \sqrt{3})(\sqrt{6} - \sqrt{3})}$. When multiplying conjugates, the result is the first term squared minus the last term squared, which is $(\sqrt{6})^2 - (\sqrt{3})^2$ or $6 - 3$. Using the Distributive Property, the numerator is $2\sqrt{6} - 2\sqrt{3}$. So, the expression in simplest form is $\frac{2\sqrt{6} - 2\sqrt{3}}{3}$.