

Practice C

For use with pages 407–414

Simplify the expressions using the properties of radicals and rational exponents.

1. $(3^{1/2} \cdot 5^{2/3})^{3/2}$

2. $(2^{1/3} \cdot 2^{3/4})^{1/2}$

3. $((5^{2/3})^{1/5})^2$

4. $\left(\frac{6^{1/2}}{6^{1/3}}\right)^{3/5}$

5. $\left(\frac{3^{1/2}}{12^{1/2}}\right)^3$

6. $\sqrt[4]{\sqrt[3]{\sqrt{2}}}$

7. $\sqrt{\frac{\sqrt{108}}{\sqrt{27}}}$

8. $\sqrt[2]{(2^2)^3 \cdot (2^2)^4}$

9. $\frac{\sqrt{\frac{3}{18}} \cdot \sqrt{3}}{\sqrt{5}}$

Simplify the expression. Assume all the variables are positive.

10. $\frac{x^{5/4} y^{2/3}}{xy}$

11. $\left(\frac{3x^{1/4} y^{2/3} z}{2xy^{1/2}}\right)^2$

12. $\left(\frac{x^{4/3} y^5}{16z^{1/2}}\right)^{-1/4}$

13. $\left[\frac{(3xy)^{1/2}}{(27x^2y)^{1/2}}\right]^{-1}$

14. $\sqrt[5]{(2x^2)^3(2x^2)^7}$

15. $\sqrt[3]{\sqrt[4]{x}} \cdot \sqrt{\sqrt[3]{x}}$

Perform the indicated operations. Assume all variables are positive.

16. $\sqrt{4\sqrt{6} - 3\sqrt{6}}$

17. $\sqrt[3]{8x^6y^2z} + x\sqrt[3]{27x^3y^2z}$

18. $\sqrt{-\sqrt[5]{x} + \sqrt[5]{32x}}$

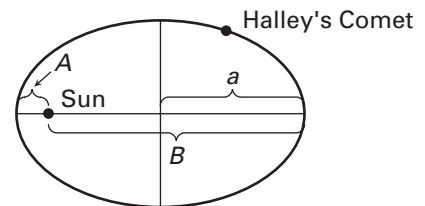
19. $\sqrt[3]{\frac{5}{y}} + \sqrt{\frac{9}{y^2}}$

20. $\sqrt[5]{y} + \sqrt[10]{y^2} - 3\sqrt[15]{y^3}$

21. $\sqrt{xy}\sqrt{3x^2y}\sqrt{3xy} - \sqrt{6x^3y}\sqrt{x}\sqrt{54y^2}$

Halley's Comet In Exercises 22 and 23, use the following information.

Halley's Comet travels in an elliptical orbit around the sun, making one complete orbit every 76 years. When the comet was closest to the sun (8.9×10^{10} meters), it developed its tail. In the diagram at the right, a is the length of the semi-major axis, A is the comet's closest distance to the sun, and B is the comet's furthest distance to the sun.



Not drawn to scale.

22. The length of the semi-major axis a can be found by the

equation $a = \left(\frac{GMT^2}{4\pi^2}\right)^{1/3}$ where

G = gravitational constant = 6.67×10^{-11} N · m²/kg²

M = mass of sun = 1.99×10^{30} kg

T = period = 2.4×10^9 seconds (76 years).

Find the length of the semi-major axis.

23. The comet's farthest distance from the sun can be calculated by $B = 2a - A$. What's the comet's farthest distance from the sun?