


-  **Got It?** 5. A golden rectangle is 12 in. long. What is the width of the rectangle? Write your answer in simplified radical form. Round to the nearest tenth of an inch.



Lesson Check

Do you know HOW?

Simplify each radical expression.

- $4\sqrt{3} + \sqrt{3}$
- $3\sqrt{6} - \sqrt{24}$
- $\sqrt{7}(\sqrt{3} - 2)$
- $(\sqrt{5} - 6)^2$
- $\frac{7\sqrt{5}}{3 + \sqrt{2}}$
- $\frac{6}{\sqrt{7} + 2}$

Do you UNDERSTAND? MATHEMATICAL PRACTICES

-  **7. Vocabulary** What is the conjugate of each expression?
 a. $\sqrt{13} - 2$ b. $\sqrt{6} + \sqrt{3}$ c. $\sqrt{5} - \sqrt{10}$
-  **8. Error Analysis** A student simplified an expression, as shown below. Describe and correct the error.

$$\frac{1}{\sqrt{3}-1} = \frac{1}{\sqrt{3}-1} \cdot \frac{\sqrt{3}+1}{\sqrt{3}+1} = \frac{\sqrt{3}+1}{9-1} = \frac{\sqrt{3}+1}{8}$$



Practice and Problem-Solving Exercises MATHEMATICAL PRACTICES

A Practice

Simplify each sum or difference.

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|--------------------------------|--------------------------------|--|------------------------------|
| 9. $\sqrt{5} + 6\sqrt{5}$ | 10. $12\sqrt{5} - 3\sqrt{5}$ | 11. $7\sqrt{3} + \sqrt{3}$ | 12. $4\sqrt{2} - 7\sqrt{2}$ |
| 13. $3\sqrt{7} - \sqrt{63}$ | 14. $4\sqrt{128} + 5\sqrt{18}$ | 15. $3\sqrt{45} - 8\sqrt{20}$ | 16. $\sqrt{28} - 5\sqrt{7}$ |
| 17. $-6\sqrt{10} + 5\sqrt{90}$ | 18. $3\sqrt{3} - 2\sqrt{12}$ | 19. $-\frac{1}{2}\sqrt{5} + 2\sqrt{125}$ | 20. $5\sqrt{8} + 2\sqrt{72}$ |

 See Problems 1 and 2.

Simplify each product.


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|--------------------------------------|---|---------------------------------|
| 21. $\sqrt{6}(\sqrt{2} + \sqrt{3})$ | 22. $\sqrt{5}(\sqrt{15} - 3)$ | 23. $3\sqrt{7}(1 - \sqrt{7})$ |
| 24. $-\sqrt{12}(4 - 2\sqrt{3})$ | 25. $5\sqrt{11}(\sqrt{3} - 3\sqrt{2})$ | 26. $(3\sqrt{11} + \sqrt{7})^2$ |
| 27. $(2 + \sqrt{10})(2 - \sqrt{10})$ | 28. $(\sqrt{6} + \sqrt{3})(\sqrt{2} - 2)$ | 29. $(5\sqrt{2} - 2\sqrt{3})^2$ |

 See Problem 3.


Simplify each quotient.

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|-----------------------------------|-----------------------------------|-------------------------------------|
| 30. $\frac{5}{\sqrt{2}-1}$ | 31. $\frac{3}{\sqrt{7}-\sqrt{3}}$ | 32. $\frac{-2}{\sqrt{6}+\sqrt{11}}$ |
| 33. $\frac{\sqrt{5}}{2-\sqrt{5}}$ | 34. $\frac{-1}{2-2\sqrt{3}}$ | 35. $\frac{7}{\sqrt{5}+\sqrt{13}}$ |

 See Problem 4.

-  **36. Biology** A shell fits into a golden rectangle with a length of 8 in. What is the shell's width? Write your answer in simplified radical form and rounded to the nearest tenth of an inch.

 See Problem 5.

-  **37. Architecture** A room is approximately shaped like a golden rectangle. Its length is 23 ft. What is the room's width? Write your answer in simplified radical form and rounded to the nearest tenth of a foot.