Name KEY Class _____ Date _____

Practice 9-4

Example Exercises

Example 1

Simplify each radical expression. Assume that all variables under radicals represent positive numbers.

1. $\sqrt{50}$ $\sqrt{25 \cdot 2}$ $5\sqrt{2}$
2. $\sqrt{48}$
3. $\sqrt{20}$ $\sqrt{4 \cdot 5}$ $2\sqrt{5}$
4. $\sqrt{8}$
5. $\sqrt{25x^5}$ $\sqrt{25x^4 x}$ $5x^2\sqrt{x}$
6. $\sqrt{75}$
7. $\sqrt{300}$ $\sqrt{100 \cdot 3}$ $10\sqrt{3}$
8. $\sqrt{49a^3}$
9. $\sqrt{125}$ $\sqrt{25 \cdot 5}$ $5\sqrt{5}$
10. $\sqrt{28}$
11. $\sqrt{63}$ $\sqrt{9 \cdot 7}$ $3\sqrt{7}$
12. $\sqrt{72}$

Example 2

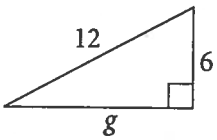
Simplify each radical expression. Assume that all variables under radicals represent positive numbers.

13. $6\sqrt{20}$ $6\sqrt{4 \cdot 5}$ $12\sqrt{5}$
14. $\sqrt{8} \cdot \sqrt{2}$ $\sqrt{16}$ 4
15. $\sqrt{ab^3}$ $\sqrt{a \cdot b^2 \cdot b}$ $b\sqrt{ab}$
16. $\sqrt{30} \cdot \sqrt{6}$
17. $12\sqrt{60x^2}$ $12\sqrt{4 \cdot 15 \cdot x^2}$ $24x\sqrt{15}$
18. $(2\sqrt{3})^2$ $4(3)$ 12
19. $\sqrt{12} \cdot \sqrt{27}$
20. $(7\sqrt{5})^2$ $49(5)$ 245
21. $\sqrt{a^5b^6}$ $\sqrt{a^4 \cdot a \cdot b^6}$ $a^2b^3\sqrt{a}$
22. $\sqrt{14} \cdot \sqrt{8}$ $\sqrt{112}$ $\sqrt{16 \cdot 7}$ $4\sqrt{7}$

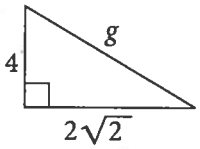
Example 3

Find *g*. Evaluate any radicals and round to the nearest tenth.

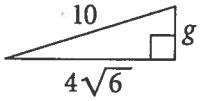
23.



24.



25.



Examples 4-6

Simplify each radical expression. Assume that all variables under radicals represent positive numbers.

26. $\sqrt{\frac{7}{9}}$
27. $\sqrt{\frac{17}{64}}$ $\frac{\sqrt{17}}{8}$
28. $\frac{\sqrt{48}}{\sqrt{8}}$
29. $\frac{\sqrt{120}}{\sqrt{10}}$ $\sqrt{12}$ $\sqrt{4 \cdot 3}$ $2\sqrt{3}$
30. $\frac{5}{\sqrt{2}}$
31. $\frac{7}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$ $\frac{7\sqrt{3}}{3}$
32. $\sqrt{\frac{15}{49}}$
33. $\frac{\sqrt{60}}{\sqrt{12}}$ $\sqrt{5}$
34. $\frac{3}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$ $\frac{3\sqrt{3}}{3}$ $\sqrt{3}$
35. $\frac{4}{\sqrt{8}}$ $\frac{4}{\sqrt{4 \cdot 2}}$ $\frac{4}{2\sqrt{2}}$ $\frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$ $\frac{2\sqrt{2}}{2}$ $\sqrt{2}$

OR

$\frac{4}{\sqrt{8}} \cdot \frac{\sqrt{8}}{\sqrt{8}}$ $\frac{4\sqrt{8}}{8}$ $\frac{4\sqrt{4 \cdot 2}}{8}$ $\frac{8\sqrt{2}}{8}$ $\sqrt{2}$

Name KEY Class _____ Date _____

Practice 9-5

Example Exercises

Example 1

Simplify each expression.

1. $5\sqrt{2} + 3\sqrt{2}$
2. $8\sqrt{5} + 6\sqrt{5}$ $\boxed{14\sqrt{5}}$
3. $\sqrt{6} + 2\sqrt{6}$
4. $4\sqrt{7} + 3\sqrt{7}$
5. $8\sqrt{10} + \sqrt{10}$ $\boxed{9\sqrt{10}}$
6. $7\sqrt{3} - 2\sqrt{3}$ $\boxed{5\sqrt{3}}$
7. $10\sqrt{6} - 8\sqrt{6}$
8. $2\sqrt{11} - 6\sqrt{11}$ $\boxed{-4\sqrt{11}}$
9. $-8\sqrt{15} + 10\sqrt{15}$ $\boxed{2\sqrt{15}}$

Example 2

Simplify each expression.

10. $3\sqrt{2} + \sqrt{8}$
11. $\sqrt{27} + 4\sqrt{3}$ $3\sqrt{3} + 4\sqrt{3}$ $\boxed{7\sqrt{3}}$
12. $\sqrt{12} + 3\sqrt{3}$
13. $\sqrt{28} + 6\sqrt{7}$ $2\sqrt{7} + 6\sqrt{7}$ $\boxed{8\sqrt{7}}$
14. $5\sqrt{3} - \sqrt{12}$ $9\sqrt{5} - 2\sqrt{5}$ $\boxed{7\sqrt{5}}$
15. $\sqrt{18} - 2\sqrt{2}$ $3\sqrt{2} - 2\sqrt{2}$ $\boxed{\sqrt{2}}$
16. $6\sqrt{2} - \sqrt{32}$
17. $9\sqrt{5} - \sqrt{20}$
18. $\sqrt{12} + \sqrt{27}$
19. $\sqrt{32} - \sqrt{8}$ $4\sqrt{2} - 2\sqrt{2}$ $\boxed{2\sqrt{2}}$
20. $4\sqrt{3} - \sqrt{12}$
21. $\sqrt{18} + \sqrt{27}$ $\sqrt{9 \cdot 2}$ $\sqrt{9 \cdot 3}$ $\boxed{3\sqrt{2} + 3\sqrt{3}}$

Example 3

Solve each exercise by using the golden ratio $(1 + \sqrt{5}) : 2$.

22. The ratio of the width : height of a door is equal to the golden ratio. The height of the door is 60 in. Find the width of the door in inches.
23. The ratio of the length : width of a pool is equal to the golden ratio. The width is 30 ft. Find the length of the pool in feet.

Example 4

Simplify each expression.

24. $3(4 + 2\sqrt{5})$
25. $-2(6\sqrt{2} - 8)$ $\boxed{-12\sqrt{2} + 16}$
26. $5(3\sqrt{2} + 4\sqrt{3})$ $\boxed{15\sqrt{2} + 20\sqrt{3}}$
27. $\sqrt{3}(6 + 2\sqrt{2})$ $\boxed{6\sqrt{3} + 2\sqrt{6}}$
28. $\sqrt{5}(8 - 3\sqrt{5})$
29. $2\sqrt{3}(1 + 8\sqrt{2})$ $\boxed{2\sqrt{3} + 16\sqrt{6}}$
30. $\sqrt{6}(\sqrt{2} - 6)$
31. $\sqrt{3}(4\sqrt{5} - 6\sqrt{3})$ $4\sqrt{15} - 6\sqrt{9}$ $\boxed{4\sqrt{15} - 18}$
32. $\sqrt{5}(\sqrt{12} - \sqrt{10})$ $\sqrt{60} - \sqrt{50}$ $\boxed{2\sqrt{15} - 5\sqrt{2}}$

33. $\dfrac{-6 \pm \sqrt{96}}{-6}$ $\dfrac{-6 \pm 4\sqrt{6}}{-6} = \boxed{\dfrac{-3 \pm 2\sqrt{6}}{-3}}$

34. $\dfrac{15 \pm \sqrt{375}}{10}$ $\dfrac{15 \pm 5\sqrt{15}}{10} = \boxed{\dfrac{3 \pm \sqrt{15}}{2}}$