The following are three examples of simplifying radicals. Simplifying each radical makes it meet a condition that must be true to show that a radical expression is in its simplest form.

Example

Condition	Not in Simplest Form	How to Simplify	Simplest Form
The Multiplication Property of Square Roots is used to simplify the radical.			
The expression under the radical sign has no perfect square factors other than 1.	$\sqrt{20}$	Rewrite as a product of perfect squares and other factors. $= \sqrt{4 \cdot 5}$ $= \sqrt{4} \cdot \sqrt{5}$	$2\sqrt{5}$
The Division Property of Square Roots is used to simplify the radical.			
The expression under the radical sign is a fraction.	$\sqrt{\frac{16}{25}}$	Separate into two radical expressions. Simplify each separately. $\frac{\sqrt{16}}{\sqrt{25}}$	$\frac{4}{5}$
The denominator contains a radical expression that is not a perfect square	$\frac{3}{\sqrt{2}}$	Rationalize the denominator by multiplying the fraction by a radical expression equal to 1. $= \frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$	$\frac{3\sqrt{2}}{2}$

Practice 11-1

Simplify each radical expression.

1. $\sqrt{32}$
2. $\sqrt{22} \cdot \sqrt{8}$
3. $\sqrt{147}$
4. $\sqrt{\frac{17}{144}}$
5. $\sqrt{a^2b^5}$
6. $\frac{2}{\sqrt{6}}$
7. $\sqrt{80}$
8. $\sqrt{27}$
9. $\frac{\sqrt{256}}{\sqrt{32}}$
10. $\frac{8}{\sqrt{7}}$
11. $\sqrt{12x^4}$
12. $\frac{\sqrt{96}}{\sqrt{12}}$
13. $\sqrt{200}$
14. $\sqrt{\frac{12}{225}}$
15. $\sqrt{15} \cdot \sqrt{6}$
16. $\sqrt{120}$
17. $\frac{4}{\sqrt{2a}}$
18. $(3\sqrt{2})^3$
19. $\sqrt{250}$
20. $\frac{\sqrt{65}}{\sqrt{13}}$
21. $\sqrt{84}$
22. $\sqrt{\frac{18}{225}}$
23. $\sqrt{48s^3}$
24. $3\sqrt{24}$
25. $\sqrt{15} \cdot \sqrt{35}$
26. $\sqrt{160}$
27. $\frac{6}{\sqrt{3}}$
28. $\frac{\sqrt{48n^6}}{\sqrt{6n^3}}$
29. $\sqrt{136}$
30. $\sqrt{\frac{27x^2}{256}}$
31. $\sqrt{m^3n^2}$
32. $\frac{\sqrt{180}}{\sqrt{9}}$
33. $\sqrt{18} \cdot \sqrt{8}$
34. $(10\sqrt{3})^2$
35. $\sqrt{\frac{17}{64}}$
36. $\sqrt{50}$
37. $\sqrt{48}$
38. $\sqrt{20}$
39. $\sqrt{8}$
40. $\sqrt{25x^2}$