

11.2 Practice A

SIMPLIFY. Clearly show work. Circle final answers.

1) $\sqrt{40} = \sqrt{4} \sqrt{10} = 2\sqrt{10}$

2) $\sqrt{125} = \sqrt{25} \sqrt{5} = 5\sqrt{5}$

3) $\sqrt{128} \rightarrow \sqrt{28} = \sqrt{4} \sqrt{7} = 2\sqrt{7}$

4) $\sqrt{500} = \sqrt{100} \sqrt{5} = 10\sqrt{5}$

5) $\sqrt{256} = 16$ ← Perfect SQUARE
 Do NOT TAKE SQ ROOT

6) $\sqrt{392} = \sqrt{196} \sqrt{2} = 14\sqrt{2}$

2 | 392
 2 | 196
 2 | 98
 7 | 49
 7

7) $\sqrt{27} = \sqrt{9} \sqrt{3} = 3\sqrt{3}$

8) $\sqrt{128} = \sqrt{64} \sqrt{2} = 8\sqrt{2}$

9) $3\sqrt{150} = 3 \cdot \sqrt{25} \sqrt{6} = 3 \cdot 5\sqrt{6} = 15\sqrt{6}$

10) $-5\sqrt{98} = -5 \cdot \sqrt{49} \sqrt{2} = -5 \cdot 7\sqrt{2} = -35\sqrt{2}$

11) $\sqrt{200x} = \sqrt{100} \sqrt{2} \sqrt{x} = 10\sqrt{2x}$

12) $\sqrt{32x^2} = \sqrt{16} \sqrt{2} \sqrt{x^2} = 4x\sqrt{2}$

13) $-4\sqrt{392x^3} = -4 \sqrt{196} \sqrt{2} \sqrt{x^2} \sqrt{x} = -4 \cdot 14 \cdot x \sqrt{2x} = -56x\sqrt{2x}$

14) $4\sqrt{125x^5} = 4 \cdot \sqrt{25} \sqrt{5} \sqrt{x^4} \sqrt{x} = 20x^2\sqrt{5x}$

15) $-\sqrt{80x^4} = -\sqrt{16} \sqrt{5} \sqrt{x^4} = -4x^2\sqrt{5}$

16) $-2\sqrt{75x^3} = -2 \sqrt{25} \sqrt{3} \sqrt{x^2} \sqrt{x} = -10x\sqrt{3x}$

SIMPLIFY. Clearly show work. NO radicals in the denominator. Simplify fractions.

$$17) \frac{\sqrt{8}}{\sqrt{25}} \rightarrow \frac{\sqrt{4 \cdot 2}}{5} = \frac{2\sqrt{2}}{5}$$

$$18) \frac{\sqrt{25}}{\sqrt{9}} \rightarrow \frac{5}{3}$$

$$19) \sqrt{\frac{144}{25}} \rightarrow \frac{\sqrt{144}}{\sqrt{25}} = \frac{12}{5}$$

$$20) \frac{\sqrt{20}}{\sqrt{16}} \rightarrow \frac{\sqrt{4 \cdot 5}}{4} = \frac{2\sqrt{5}}{4} \xrightarrow{\text{Reduce}} \frac{\sqrt{5}}{2}$$

RATIONALIZE THE DENOMINATOR

$$21) \frac{\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \rightarrow \frac{\sqrt{10}}{\sqrt{4}} = \frac{\sqrt{10}}{2}$$

$$22) \frac{\sqrt{3}}{\sqrt{6}} \left(\frac{\sqrt{6}}{\sqrt{6}} \right) = \frac{\sqrt{18}}{6} = \frac{\sqrt{9 \cdot 2}}{6} \xrightarrow{\text{Reduce}} \frac{3\sqrt{2}}{6} = \frac{\sqrt{2}}{2}$$

$$23) \frac{3\sqrt{6}}{\sqrt{3}} \left(\frac{\sqrt{3}}{\sqrt{3}} \right) = \frac{3\sqrt{18}}{3} = \sqrt{9 \cdot 2} = 3\sqrt{2}$$

$$24) \frac{2\sqrt{15}}{4\sqrt{16}} = \frac{2\sqrt{15}}{4 \cdot 4} = \frac{2\sqrt{15}}{16} \xrightarrow{\text{Reduce}} \frac{\sqrt{15}}{8}$$

$$25) \frac{4\sqrt{10}}{\sqrt{45}} = \frac{4\sqrt{2 \cdot 5}}{\sqrt{9 \cdot 5}} = \frac{4\sqrt{2}}{3}$$

$$26) \frac{\sqrt{2}}{4\sqrt{50}} \cdot \frac{\sqrt{50}}{\sqrt{50}} = \frac{\sqrt{100}}{4 \cdot 50} = \frac{10}{200} = \frac{1}{20}$$

Lots of ways to simplify

$$27) \frac{\sqrt{10}}{\sqrt{32}} \cdot \frac{\sqrt{32}}{\sqrt{32}} = \frac{\sqrt{320}}{32} = \frac{\sqrt{64 \cdot 5}}{32} \xrightarrow{\text{Reduce}} \frac{8\sqrt{5}}{32} = \frac{\sqrt{5}}{4}$$

$$28) \frac{5\sqrt{5}}{\sqrt{80}} \cdot \frac{\sqrt{80}}{\sqrt{80}} = \frac{5\sqrt{400}}{80} = \frac{5 \cdot 20}{80} = \frac{100}{80} = \frac{5}{4}$$

$$29) \frac{3\sqrt{15}}{4\sqrt{20}} \cdot \frac{\sqrt{20}}{\sqrt{20}} = \frac{3\sqrt{300}}{4 \cdot 20} = \frac{3\sqrt{100 \cdot 3}}{80} = \frac{30\sqrt{3}}{80} = \frac{3\sqrt{3}}{8}$$

$$30) \frac{4\sqrt{15}}{3\sqrt{125}} = \frac{\sqrt{125}}{\sqrt{125}} = \frac{4\sqrt{1875}}{3 \cdot 125} = \frac{4\sqrt{625 \cdot 3}}{375} = \frac{4 \cdot 25 \sqrt{3}}{375} \xrightarrow{\text{Reduce}} \frac{4\sqrt{3}}{15}$$

SIMPLIFY. Clearly show work.

COMBINE LIKE RADICALS

31) $-2\sqrt{3} - 3\sqrt{3} - \sqrt{3} - 2\sqrt{6}$

$$\boxed{-2\sqrt{6} - 6\sqrt{3}}$$

32) $-2\sqrt{2} - \sqrt{3} - 2\sqrt{6} + 2\sqrt{3}$

$$\boxed{-2\sqrt{2} + \sqrt{3} - 2\sqrt{6}}$$

33) $-3\sqrt{3} - \sqrt{6} + 3\sqrt{6}$

$$\boxed{-3\sqrt{3} + 2\sqrt{6}}$$

34) $-2\sqrt{18} - 2\sqrt{18} - 3\sqrt{3}$

$$\begin{aligned} & -4\sqrt{18} - 3\sqrt{3} \\ & -4\sqrt{3 \cdot 6} - 3\sqrt{3} \\ & \boxed{-12\sqrt{2} - 3\sqrt{3}} \end{aligned}$$

35) $-3\sqrt{20} - 2\sqrt{12} - 2\sqrt{20}$

$$\begin{aligned} & -5\sqrt{20} - 2\sqrt{12} \\ & -5\sqrt{4 \cdot 5} - 2\sqrt{4 \cdot 3} \\ & -5 \cdot 2\sqrt{5} - 2 \cdot 2\sqrt{3} \\ & \boxed{-10\sqrt{5} - 4\sqrt{3}} \end{aligned}$$

36) $-2\sqrt{24} - 2\sqrt{24} - 2\sqrt{24}$

$$\begin{aligned} & -6\sqrt{24} = \\ & -6\sqrt{4 \cdot 6} = \\ & -6 \cdot 2\sqrt{6} \\ & \boxed{-12\sqrt{6}} \end{aligned}$$

37) $-\sqrt{27} + 3\sqrt{20} + 3\sqrt{45}$

$$\begin{aligned} & -\sqrt{9 \cdot 3} + 3\sqrt{4 \cdot 5} + 3\sqrt{9 \cdot 5} \\ & -3\sqrt{3} + 3 \cdot 2\sqrt{5} + 3 \cdot 3\sqrt{5} \\ & -3\sqrt{3} + 6\sqrt{5} + 9\sqrt{5} = \\ & \boxed{-3\sqrt{3} + 15\sqrt{5}} \end{aligned}$$

38) $-3\sqrt{12} - 2\sqrt{54} - 3\sqrt{24}$

$$\begin{aligned} & -3\sqrt{4 \cdot 3} - 2\sqrt{9 \cdot 6} - 3\sqrt{4 \cdot 6} \\ & -3 \cdot 2\sqrt{3} - 2 \cdot 3\sqrt{6} - 3 \cdot 2\sqrt{6} \\ & -6\sqrt{3} - 6\sqrt{6} - 6\sqrt{6} \\ & \boxed{-6\sqrt{3} - 12\sqrt{6}} \end{aligned}$$

SIMPLIFY. Clearly show work. Circle final answer

39) $\sqrt{3}(\sqrt{3} + 5) =$

$\sqrt{9} + 5\sqrt{3} =$

$3 + 5\sqrt{3}$

$3 + 5x$

Cannot simplify

41) $\sqrt{5}(4 + \sqrt{5})$

$4\sqrt{5} + \sqrt{25}$

$4\sqrt{5} + 5$

43) $(-3\sqrt{5} + \sqrt{3})(2\sqrt{5} - 5\sqrt{2})$

$-6(5) + 15\sqrt{10} + 2\sqrt{15} - 5\sqrt{6}$

$-30 + 15\sqrt{10} + 2\sqrt{15} - 5\sqrt{6}$

40) $4\sqrt{15}(4 + \sqrt{6})$

$4 \cdot 4\sqrt{15} + 4\sqrt{96}$
 $16\sqrt{15} + 4\sqrt{16 \cdot 6}$

$16\sqrt{15} + 12\sqrt{6}$

42) $\sqrt{3}(\sqrt{10} + 3)$

$\sqrt{30} + 3\sqrt{3}$

44) $(4 - 3\sqrt{2})(-3 + \sqrt{2})$

$-12 + 4\sqrt{2} + 9\sqrt{2} - 3(2)$

$-18 + 13\sqrt{2}$

45) $(\sqrt{2} + \sqrt{3})^2$

$(\sqrt{2} + \sqrt{3})(\sqrt{2} + \sqrt{3})$

$2 + \sqrt{6} + \sqrt{6} + 3 =$

$5 + 2\sqrt{6}$

47) $(-4\sqrt{3} + 3\sqrt{5})(-3\sqrt{5} - 5\sqrt{5})$

$12\sqrt{15} + 20\sqrt{15} - 9(5) - 15(5)$
 $-45 \quad -75$

$32\sqrt{15} - 120$

46) $(\sqrt{3} + \sqrt{5})^2$

$(\sqrt{3} + \sqrt{5})(\sqrt{3} + \sqrt{5})$

$3 + \sqrt{15} + \sqrt{15} + 5 =$

$8 + 2\sqrt{15}$

48) $(3\sqrt{2} - 3\sqrt{3})(4\sqrt{2} - 4\sqrt{3})$

$12(2) - 12\sqrt{6} - 12\sqrt{6} + 12(3)$
 $24 \quad 36$

$60 - 24\sqrt{6}$