

1. Simplify.

a. $\frac{\sqrt{8}}{2\sqrt{2}}$

b. $\frac{\sqrt{24}}{2\sqrt{6}}$

c. $\frac{\sqrt{42}}{\sqrt{42}}$

d. $\frac{\sqrt{12}}{2\sqrt{3}}$

e. $\frac{\sqrt{56}}{2\sqrt{14}}$

f. $\frac{\sqrt{100}}{10}$

g. $\frac{\sqrt[3]{-250}}{-5\sqrt{10}}$

h. $\frac{\sqrt{125}}{5\sqrt{5}}$

i. $\frac{\sqrt{45}}{3\sqrt{5}}$

a. $\frac{\sqrt{18}}{3\sqrt{2}}$

b. $\frac{\sqrt{36}}{6}$

c. $\frac{\sqrt{50}}{2\sqrt{5}}$

d. $\frac{\sqrt{40}}{2\sqrt{10}}$

e. $\frac{\sqrt{45}}{3\sqrt{5}}$

f. $\frac{\sqrt[3]{40}}{2\sqrt[3]{5}}$

g. $\frac{2\sqrt{50}}{2(5\sqrt{2})}$
 $10\sqrt{2}$

h. $\frac{5\sqrt{12}}{5(2\sqrt{3})}$
 $10\sqrt{3}$

i. $\frac{-3\sqrt{28}}{-3(2\sqrt{7})}$
 $-6\sqrt{7}$

2. Simplify

a. $3\sqrt{3} - 4\sqrt{3} + 5\sqrt{3} + \sqrt{3}$
 $5\sqrt{3}$

b. $4\sqrt{3} - 4\sqrt{2} + 4\sqrt{3} + 5\sqrt{2}$
 $8\sqrt{3} + 1\sqrt{2}$

c. $3\sqrt{12} - 4\sqrt{27} + 5\sqrt{48}$
 $6\sqrt{3} - 12\sqrt{3} + 20\sqrt{3}$
 $14\sqrt{3}$

d. $\sqrt{20} - 3\sqrt{245} + 4\sqrt{20}$
 $2\sqrt{5} -$

e. $-3\sqrt{8} - 2\sqrt{18} + 5\sqrt{72}$
 $-6\sqrt{2} - 6\sqrt{2} + 30\sqrt{2}$
 $18\sqrt{2}$

f. $-3\sqrt{50} - \sqrt{32} + 5\sqrt{200}$
 $-15\sqrt{2} - 4\sqrt{2} + 50\sqrt{2}$
 $31\sqrt{2}$

g. $12\sqrt{18} - 2\sqrt{27} - 2\sqrt{18} + 6\sqrt{3}$
 $= 12(3\sqrt{2}) - 2(3\sqrt{3}) - 2(3\sqrt{2}) + 6\sqrt{3}$
 $= 36\sqrt{2} - 6\sqrt{3} - 6\sqrt{2} + 6\sqrt{3}$
 $= 30\sqrt{2}$

h. $4\sqrt{12} + 5\sqrt{27} - 6\sqrt{48} + 2\sqrt{75}$
 $= 4(2\sqrt{3}) + 5(3\sqrt{3}) - 6(4\sqrt{3}) + 2(5\sqrt{3})$
 $= 8\sqrt{3} + 15\sqrt{3} - 24\sqrt{3} + 10\sqrt{3}$
 $= +9\sqrt{3}$

3. Simplify

a. $(2\sqrt{3})(4\sqrt{2})$
 $= 8\sqrt{6}$

b. $(4\sqrt{6})(2\sqrt{3})$
 $= 8\sqrt{18}$
 $= 8(3\sqrt{2})$
 $= 24\sqrt{2}$

$$\begin{aligned} \text{c. } & (-\sqrt{10})(4\sqrt{2}) \\ = & -4\sqrt{20} \\ = & -8\sqrt{5} \end{aligned}$$

$$\begin{aligned} \text{d. } & (3\sqrt{3})(-2\sqrt{2})(5\sqrt{6}) \\ = & -30\sqrt{36} \\ = & -180 \end{aligned}$$

$$\begin{aligned} \text{e. } & (3\sqrt{5})(2\sqrt{2}-3\sqrt{3}) \\ = & 6\sqrt{10} - 9\sqrt{15} \end{aligned}$$

$$\begin{aligned} \text{f. } & (-3\sqrt{3})(2\sqrt{6}-3\sqrt{2}) \\ & -6\sqrt{18} + 9\sqrt{6} \\ = & -18\sqrt{2} + 9\sqrt{6} \end{aligned}$$

$$\begin{aligned} \text{g. } & (3\sqrt{5}+4\sqrt{2})(2\sqrt{2}-3\sqrt{3}) \\ & 6\sqrt{10} - 9\sqrt{15} + 8\sqrt{4} - 12\sqrt{6} \\ = & 6\sqrt{10} - 9\sqrt{15} + 16 - 12\sqrt{6} \end{aligned}$$

$$\begin{aligned} \text{h. } & (3\sqrt{5}+\sqrt{2})(2\sqrt{5}-3\sqrt{3}) \\ & 6(\sqrt{25}-9\sqrt{15}+2\sqrt{10}-3\sqrt{6}) \\ & 30 - 9\sqrt{15} + 2\sqrt{10} - 3\sqrt{6} \end{aligned}$$

$$\begin{aligned} \text{i. } & (4+\sqrt{2})(4-\sqrt{2}) \\ = & 16 - 4\sqrt{2} + 4\sqrt{2} - 2 \\ = & 14 \end{aligned}$$

$$\begin{aligned} \text{j. } & (5\sqrt{5}+4\sqrt{2})(6\sqrt{3}-\sqrt{2}) \\ = & 30\sqrt{15} - 5\sqrt{10} + 24\sqrt{6} + 4\sqrt{4} \\ = & 30\sqrt{15} - 5\sqrt{10} + 2\sqrt{6} + 8 \end{aligned}$$

$$\begin{aligned} \text{k. } & \left(\frac{2}{\sqrt{2}}\right)\frac{\sqrt{2}}{\sqrt{2}} \\ = & \frac{2\sqrt{2}}{2} \\ = & \sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{l. } & \left(\frac{5}{\sqrt{3}}\right)\frac{\sqrt{3}}{\sqrt{3}} \\ = & \frac{5\sqrt{3}}{3} \end{aligned}$$

$$\begin{aligned} \text{m. } & \left(\frac{1+\sqrt{5}}{\sqrt{2}}\right)\left(\frac{\sqrt{2}}{\sqrt{2}}\right) \\ = & \frac{\sqrt{2} + \sqrt{10}}{2} \end{aligned}$$

4. Simplify each of the following and state restrictions.

a. $\sqrt{x^3}$
 $= x\sqrt{x}$
 $x \geq 0$

b. $\sqrt{50x^4}$
 $5x\sqrt{2}$
 $x \in \mathbb{R}$

c. $\sqrt{8x}$
 $2x\sqrt{2}$
 $x \geq 0$

d. $\sqrt{54x^5}$
 $3x^2\sqrt{6x}$
 $x \geq 0$

02. Add the following:

a. $\sqrt{x} + 5\sqrt{x}$
 $6\sqrt{x}$

b. $2\sqrt{x} - 4\sqrt{9x}$
 $2\sqrt{2} - 12\sqrt{x}$
 $= -10\sqrt{x}$

5. Multiply the following:

a. $(3x\sqrt{5x})(4\sqrt{2x^2})$
 $12x\sqrt{10x^3}$
 $= 12x^2\sqrt{10x}$

b. $(2\sqrt{3x})(5\sqrt{6x^2})$ *← MISTAKE*
 $5\sqrt{6x^3}$
 $= 10\sqrt{18x^4}$
 $= 10(3x^2\sqrt{2})$
 $= 30x^2\sqrt{2}$

6. What are the restriction on :

a. $\sqrt{2x-5}$ $2x-5 \geq 0$
 $2x \geq 5$
 $x \geq 5/2$

b. $\sqrt{6-2x}$ $6-2x \geq 0$
 $-2x \geq -6$
 $x \leq 6/2$
 $x \leq 3$

7. Divide the following:

a. $\left(\frac{1}{\sqrt{x}}\right)\left(\frac{\sqrt{x}}{\sqrt{x}}\right)$
 $= \frac{\sqrt{x}}{x}$

b. $\left(\frac{\sqrt{2x}}{\sqrt{3x}}\right)\left(\frac{\sqrt{3x}}{\sqrt{3x}}\right)$
 $= \frac{\sqrt{6x^2}}{3x}$
 $= \frac{x\sqrt{6x}}{3x}$
 $= \frac{\sqrt{6x}}{3}$

c. $\left(\frac{3}{\sqrt{2x}}\right)\left(\frac{\sqrt{2x}}{\sqrt{2x}}\right)$
 $= \frac{\sqrt{6x}}{2x}$