

Simplifying Square Roots

Date 3/15 Period _____

Simplify.

1) $\sqrt{96}$

2) $\sqrt{216}$

3) $\sqrt{98}$

4) $\sqrt{18}$

5) $\sqrt{72}$

6) $\sqrt{144}$

7) $\sqrt{45}$

8) $\sqrt{175}$

9) $\sqrt{343}$

10) $\sqrt{12}$

11) $10\sqrt{96}$

$$\begin{array}{l}
 10\sqrt{6 \cdot 16} \\
 \leftarrow \\
 4 \cdot 10\sqrt{6} \\
 40\sqrt{6}
 \end{array}$$

12) $9\sqrt{245}$

$$\begin{array}{l}
 9\sqrt{5 \cdot 49} \\
 7 \cdot 9\sqrt{5} \\
 63\sqrt{5}
 \end{array}$$

13-24

13) $7\sqrt{600}$

14) $5\sqrt{45}$

15) $5\sqrt{180}$

16) $3\sqrt{405}$

17) $2\sqrt{36}$

18) $9\sqrt{125}$

19) $8\sqrt{27}$

20) $12\sqrt{1764}$

21) $3\sqrt{900}$

22) $7\sqrt{2535}$

23) $11\sqrt{1215}$

24) $2\sqrt{200}$

Adding and Subtracting Radical Expressions

Simplify. *need common index + radicand*

$$-\frac{3}{7} + \frac{4}{7} = \frac{1}{7}$$

$$\begin{array}{r}
 1) \ 3\sqrt{6} - 4\sqrt{6} \\
 3x - 4x \\
 -1x \\
 \hline
 3 - 4 \\
 -1\sqrt{6} \\
 -\sqrt{6}
 \end{array}$$

$$\begin{array}{r}
 2) \ -3\sqrt{7} + 4\sqrt{7} \\
 \hline
 1\sqrt{7}
 \end{array}$$

$$\begin{array}{r}
 \sqrt{2} + \sqrt{2} \\
 \hline
 \text{prime}
 \end{array}$$

$$\begin{array}{r}
 3) \ -11\sqrt{21} - 11\sqrt{21} \\
 \hline
 -11 - 11 = -22 \\
 -22\sqrt{21}
 \end{array}$$

$$4) \ -9\sqrt{15} + 10\sqrt{15}$$

$$\begin{array}{r}
 \sqrt{2} + \sqrt{3} \\
 \hline
 \text{prime}
 \end{array}$$

$$5) \ -10\sqrt{7} + 12\sqrt{7}$$

$$6) \ -3\sqrt{17} - 4\sqrt{17}$$

$$7) \ -10\sqrt{11} - 11\sqrt{11}$$

$$8) \ -2\sqrt{3} + 3\sqrt{27}$$

$$\begin{array}{r}
 \phantom{-2\sqrt{3}} + 3\sqrt{9 \cdot 3} \\
 \phantom{-2\sqrt{3}} + 3 \cdot 3\sqrt{3} \\
 \phantom{-2\sqrt{3}} + 9\sqrt{3} \\
 -2\sqrt{3} + 9\sqrt{3} = 7\sqrt{3}
 \end{array}$$

$$9) \ 2\sqrt{6} - 2\sqrt{24}$$

$$10) \ 2\sqrt{6} + 3\sqrt{54}$$

$$\begin{array}{r}
 \phantom{2\sqrt{6}} - 2\sqrt{4 \cdot 6} \\
 \phantom{2\sqrt{6}} - 2 \cdot 2\sqrt{6} \\
 \phantom{2\sqrt{6}} - 4\sqrt{6} \\
 2\sqrt{6} - 4\sqrt{6} = -2\sqrt{6}
 \end{array}$$

$$11) \ -\sqrt{12} + 3\sqrt{3}$$

$$12) \ 3\sqrt{3} - \sqrt{27}$$

13) $3\sqrt{8} + 3\sqrt{2}$

14) $-3\sqrt{6} + 3\sqrt{6}$

$$-\frac{3}{6} + \frac{3}{6} = \frac{0}{6} = 0$$

$$-3 + 3 = 0\sqrt{6} = 0$$

15) $-3\sqrt{20} - \sqrt{5}$

16) $2\sqrt{45} - 2\sqrt{5}$

17) $3\sqrt{18} - 2\sqrt{2}$

18) $-3\sqrt{18} + 3\sqrt{8} - \sqrt{24}$

$$\begin{aligned} & \textcircled{9}^2 \quad \textcircled{4}^2 \quad 4 \cdot 6 \\ & -3 \cdot 3\sqrt{2} + 3 \cdot 2\sqrt{2} - 2\sqrt{6} \\ & -9\sqrt{2} + 6\sqrt{2} - 2\sqrt{6} \\ & -3\sqrt{2} - 2\sqrt{6} \end{aligned}$$

19) $3\sqrt{18} + 3\sqrt{12} + 2\sqrt{27}$

20) $-3\sqrt{5} - \sqrt{6} - \sqrt{5}$

21) $-3\sqrt{2} + 3\sqrt{20} - 3\sqrt{8}$

22) $-3\sqrt{3} - \sqrt{8} - 3\sqrt{3}$

23) $-2\sqrt{20} + 2\sqrt{18} - 2\sqrt{5}$

24) $2\sqrt{18} - 2\sqrt{12} + 2\sqrt{18}$

25) $-\sqrt{45} + 2\sqrt{5} - \sqrt{20} - 2\sqrt{6}$

26) $2\sqrt{20} - \sqrt{20} + 3\sqrt{20} - 2\sqrt{45}$

27) $-3\sqrt{45} + 2\sqrt{12} + 3\sqrt{6} - 3\sqrt{20}$

28) $-\sqrt{27} - 3\sqrt{45} - \sqrt{20} + 2\sqrt{45}$

Adding and Subtracting Radical Expressions

Simplify.

1) $3\sqrt{6} - 4\sqrt{6}$

$$-\sqrt{6}$$

2) $-3\sqrt{7} + 4\sqrt{7}$

$$\sqrt{7}$$

3) $-11\sqrt{21} - 11\sqrt{21}$

$$-22\sqrt{21}$$

4) $-9\sqrt{15} + 10\sqrt{15}$

$$\sqrt{15}$$

5) $-10\sqrt{7} + 12\sqrt{7}$

$$2\sqrt{7}$$

6) $-3\sqrt{17} - 4\sqrt{17}$

$$-7\sqrt{17}$$

7) $-10\sqrt{11} - 11\sqrt{11}$

$$-21\sqrt{11}$$

8) $-2\sqrt{3} + 3\sqrt{27}$

$$7\sqrt{3}$$

9) $2\sqrt{6} - 2\sqrt{24}$

$$-2\sqrt{6}$$

10) $2\sqrt{6} + 3\sqrt{54}$

$$11\sqrt{6}$$

11) $-\sqrt{12} + 3\sqrt{3}$

$$\sqrt{3}$$

12) $3\sqrt{3} - \sqrt{27}$

$$\begin{array}{r}
 0 \quad \wedge \\
 3\sqrt{3} - \sqrt{9}\sqrt{3} \\
 3\sqrt{3} - 3\sqrt{3} \\
 \hline
 \end{array}$$

$$3 - 3 = 0$$

$$0\sqrt{3}$$

$$\boxed{0}$$

KEY

13) $3\sqrt{8} + 3\sqrt{2}$
 $9\sqrt{2}$

14) $-3\sqrt{6} + 3\sqrt{6}$
 0

15) $-3\sqrt{20} - \sqrt{5}$
 $-7\sqrt{5}$

16) $2\sqrt{45} - 2\sqrt{5}$
 $4\sqrt{5}$

17) $3\sqrt{18} - 2\sqrt{2}$
 $7\sqrt{2}$

18) $-3\sqrt{18} + 3\sqrt{8} - \sqrt{24}$
 $-3\sqrt{2} - 2\sqrt{6}$

19) $3\sqrt{18} + 3\sqrt{12} + 2\sqrt{27}$
 $9\sqrt{2} + 12\sqrt{3}$

20) $-3\sqrt{5} - \sqrt{6} - \sqrt{5}$
 $-4\sqrt{5} - \sqrt{6}$

21) $-3\sqrt{2} + 3\sqrt{20} - 3\sqrt{8}$
 $-9\sqrt{2} + 6\sqrt{5}$

22) $-3\sqrt{3} - \sqrt{8} - 3\sqrt{3}$
 $-6\sqrt{3} - 2\sqrt{2}$

23) $-2\sqrt{20} + 2\sqrt{18} - 2\sqrt{5}$
 $-6\sqrt{5} + 6\sqrt{2}$

24) $2\sqrt{18} - 2\sqrt{12} + 2\sqrt{18}$
 $12\sqrt{2} - 4\sqrt{3}$

25) $-\sqrt{45} + 2\sqrt{5} - \sqrt{20} - 2\sqrt{6}$
 $-3\sqrt{5} - 2\sqrt{6}$

26) $2\sqrt{20} - \sqrt{20} + 3\sqrt{20} - 2\sqrt{45}$
 $2\sqrt{5}$

27) $-3\sqrt{45} + 2\sqrt{12} + 3\sqrt{6} - 3\sqrt{20}$
 $-15\sqrt{5} + 4\sqrt{3} + 3\sqrt{6}$

28) $-\sqrt{27} - 3\sqrt{45} - \sqrt{20} + 2\sqrt{45}$
 $-3\sqrt{3} - 5\sqrt{5}$

Simplifying Square Roots

Simplify.

1) $\frac{\sqrt{96}}{4\sqrt{6}}$

2) $\frac{\sqrt{216}}{6\sqrt{6}}$

3) $\frac{\sqrt{98}}{7\sqrt{2}}$

4) $\frac{\sqrt{18}}{3\sqrt{2}}$

5) $\frac{\sqrt{72}}{6\sqrt{2}}$

6) $\frac{\sqrt{144}}{12}$

7) $\frac{\sqrt{45}}{3\sqrt{5}}$

8) $\frac{\sqrt{175}}{5\sqrt{7}}$

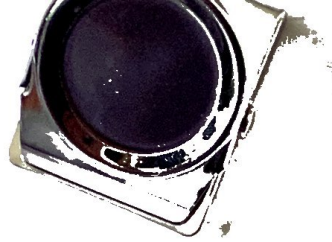
9) $\frac{\sqrt{343}}{7\sqrt{7}}$

10) $\frac{\sqrt{12}}{2\sqrt{3}}$

11) $\frac{10\sqrt{96}}{40\sqrt{6}}$

12) $\frac{9\sqrt{245}}{63\sqrt{5}}$

$$13) \frac{7\sqrt{600}}{70\sqrt{6}}$$



$$14) \frac{5\sqrt{45}}{15\sqrt{5}}$$

KEY

$$15) \frac{5\sqrt{180}}{30\sqrt{5}}$$

$$16) \frac{3\sqrt{405}}{27\sqrt{5}}$$

$$17) \frac{2\sqrt{36}}{12}$$

$$18) \frac{9\sqrt{125}}{45\sqrt{5}}$$

$$19) \frac{8\sqrt{27}}{24\sqrt{3}}$$

$$20) \frac{12\sqrt{1764}}{504}$$

$$21) \frac{3\sqrt{900}}{90}$$

$$22) \frac{7\sqrt{2535}}{91\sqrt{15}}$$

$$23) \frac{11\sqrt{1215}}{99\sqrt{15}}$$

$$24) \frac{2\sqrt{200}}{20\sqrt{2}}$$