

Radicals: Mixed Operations

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Simplify.

1) $\sqrt{252}$

3) $-8\sqrt{384}$

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

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

9) $\sqrt{6} + \sqrt{24}$

11) $-2\sqrt{12} - \sqrt{12}$

13) $-\sqrt{6} + 2\sqrt{6} - \sqrt{18}$

15) $\sqrt{3} \cdot \sqrt{3}$

17) $-3\sqrt{15}(5 + \sqrt{3})$

19) $(4\sqrt{5} - 3)(\sqrt{5} - 2)$

21) $\frac{\sqrt{3}}{\sqrt{5}}$

23) $\frac{4\sqrt{3}}{5\sqrt{5}}$

25) $-\frac{2}{5 + \sqrt{3}}$

2) $\sqrt{24} = 2\sqrt{6}$

4) $7\sqrt{175} = 35\sqrt{7}$

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

8) $2\sqrt{5} - 2\sqrt{6} + 3\sqrt{5} = 5\sqrt{5} - 2\sqrt{6}$

10) $\sqrt{5} + \sqrt{5} = 2\sqrt{5}$

12) $3\sqrt{54} + 2\sqrt{24} = 13\sqrt{6}$

14) $3\sqrt{12} - 2\sqrt{12} - \sqrt{54} = 2\sqrt{3} - 3\sqrt{6}$

16) $\sqrt{5} \cdot \sqrt{5} = 5$

18) $3\sqrt{5}(\sqrt{5} + 3) = 15 + 9\sqrt{5}$

20) $(3\sqrt{5} + \sqrt{3})(\sqrt{5} + \sqrt{3}) = 18 + 4\sqrt{15}$

22) $\frac{\sqrt{2}}{\sqrt{5}} = \frac{\sqrt{10}}{5}$

24) $\frac{2\sqrt{2}}{4\sqrt{3}} = \frac{\sqrt{6}}{6}$

26) $\frac{2}{-2 - 5\sqrt{2}} = \frac{-2 + 5\sqrt{2}}{-23}$ or $\frac{2 - 5\sqrt{2}}{23}$

Homework 1.1

$$2. \sqrt{24} = \sqrt{2 \cdot 2 \cdot 2 \cdot 3} = 2\sqrt{6}$$

$\begin{matrix} \wedge & \wedge \\ 6 & 4 \\ \wedge & \wedge \\ 2 & 3 \end{matrix}$
 $\begin{matrix} \wedge & \wedge \\ 2 & 2 \end{matrix}$

$$4. 7\sqrt{175} = 7\sqrt{5 \cdot 5 \cdot 7} = 7 \cdot 5\sqrt{7} = 35\sqrt{7}$$

$\begin{matrix} \wedge \\ 25 \end{matrix}$
 $\begin{matrix} \wedge \\ 55 \end{matrix}$

$$6. -3\sqrt{2} - 3\sqrt{2} = -6\sqrt{2}$$

$$8. 2\sqrt{5} - 2\sqrt{6} + 3\sqrt{5} = 5\sqrt{5} - 2\sqrt{6}$$

$$10. \sqrt{5} + \sqrt{5} = 2\sqrt{5}$$

$$12. 3\sqrt{54} + 2\sqrt{24} = 3\sqrt{3 \cdot 3 \cdot 3 \cdot 2} + 2\sqrt{2 \cdot 2 \cdot 2 \cdot 3} = 9\sqrt{6} + 4\sqrt{6} = 13\sqrt{6}$$

$\begin{matrix} \wedge & \wedge \\ 27 & 2 \\ \wedge & \wedge \\ 3 & 9 \\ \wedge \\ 33 \end{matrix}$
 $\begin{matrix} \wedge & \wedge \\ 6 & 4 \\ \wedge & \wedge \\ 3 & 2 \end{matrix}$

$$14. 3\sqrt{12} - 2\sqrt{12} - \sqrt{54} = \sqrt{12} - \sqrt{54} = 2\sqrt{3} - 3\sqrt{6}$$

$$= 1\sqrt{12} - \sqrt{54}$$

$\begin{matrix} \wedge & \wedge \\ 4 & 3 \\ \wedge & \wedge \\ 2 & 2 \end{matrix}$
 $\begin{matrix} \wedge & \wedge \\ 27 & 2 \\ \wedge & \wedge \\ 3 & 9 \\ \wedge \\ 33 \end{matrix}$

$$16. \sqrt{5} \cdot \sqrt{5} = \sqrt{25} = 5$$

$$18. \quad 3\sqrt{5} (\sqrt{5} + 3) = 3\sqrt{25} + 9\sqrt{5} = 15 + 9\sqrt{5}$$

20. $3\sqrt{5} + \sqrt{3}$

$\sqrt{5}$	$\begin{matrix} 3\sqrt{25} \\ = 15 \end{matrix}$	$\sqrt{5}$
$+\sqrt{3}$	$3\sqrt{15}$	$\begin{matrix} \sqrt{9} \\ = 3 \end{matrix}$

$$15 + 3 + 3\sqrt{15} + 1\sqrt{15}$$

$$18 + 4\sqrt{15}$$

$$22. \quad \frac{\sqrt{2}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{10}}{\sqrt{25}} = \frac{\sqrt{10}}{5}$$

$$24. \quad \frac{2\sqrt{2}}{4\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{6}}{4\sqrt{9}} = \frac{2\sqrt{6}}{12} = \frac{\sqrt{6}}{6}$$

$$26. \quad \frac{2}{-2-5\sqrt{2}} \cdot \frac{(-2+5\sqrt{2})}{(-2+5\sqrt{2})} = \frac{-4+10\sqrt{2}}{-4+25} = \frac{-4+10\sqrt{2}}{21}$$

	-2	$-5\sqrt{2}$
-2	4	$10\sqrt{2}$
$+5\sqrt{2}$	$-10\sqrt{2}$	$-25(2)$

$$4 - 50 = -46$$