L61- Worksheet - Adding, Subtracting, Multiplying and Dividing.

KEY

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

$-21\sqrt{11}$

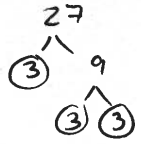
8) $-2\sqrt{3} + 3\sqrt{27}$

$-2\sqrt{3} + 3\sqrt{3^2 \cdot 3}$

$-2\sqrt{3} + 3 \cdot 3\sqrt{3}$

$-2\sqrt{3} + 9\sqrt{3}$

$7\sqrt{3}$

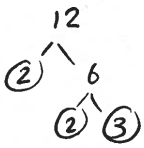


9) $-\sqrt{12} + 3\sqrt{3}$

$-\sqrt{2^2 \cdot 3} + 3\sqrt{3}$

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

$\sqrt{3}$

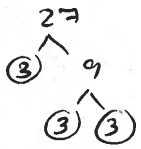


10) $3\sqrt{3} - \sqrt{27}$

$3\sqrt{3} - \sqrt{3^2 \cdot 3}$

$3\sqrt{3} - 3\sqrt{3}$

$\emptyset$



KEY

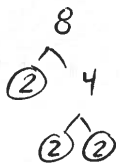
11) $3\sqrt{8}+3\sqrt{2}$

$3\sqrt{2^2\cdot 2}+3\sqrt{2}$

$3\cdot 2\sqrt{2}+3\sqrt{2}$

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

$9\sqrt{2}$



12) $-3\sqrt{6}+3\sqrt{6}$

$\emptyset$

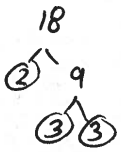
13) $3\sqrt{18}-2\sqrt{2}$

$3\sqrt{2\cdot 3^2}-2\sqrt{2}$

$3\cdot 3\sqrt{2}-2\sqrt{2}$

$9\sqrt{2}-2\sqrt{2}$

$7\sqrt{2}$



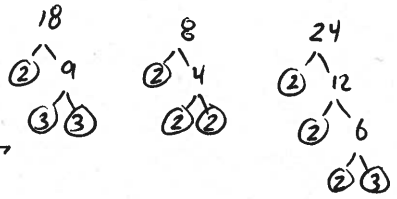
14) $-3\sqrt{18}+3\sqrt{8}-\sqrt{24}$

$-3\sqrt{2\cdot 3^2}+3\sqrt{2\cdot 2^2}-\sqrt{2^2\cdot 2\cdot 3}$

$-3\cdot 3\sqrt{2}+3\cdot 2\sqrt{2}-2\sqrt{2\cdot 3}$

$-9\sqrt{2}+6\sqrt{2}-2\sqrt{6}$

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



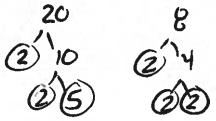
15) $-3\sqrt{2}+3\sqrt{20}-3\sqrt{8}$

$-3\sqrt{2}+3\sqrt{2^2\cdot 5}-3\sqrt{2^2\cdot 2}$

$-3\sqrt{2}+3\cdot 2\sqrt{5}-3\cdot 2\sqrt{2}$

$-3\sqrt{2}+6\sqrt{5}-6\sqrt{2}$

$-9\sqrt{2}+6\sqrt{5}$

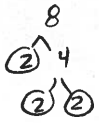


16) $-3\sqrt{3}-\sqrt{8}-3\sqrt{3}$

$-3\sqrt{3}-\sqrt{2^2\cdot 2}-3\sqrt{3}$

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

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

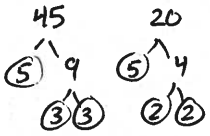


17) $-\sqrt{45}+2\sqrt{5}-\sqrt{20}-2\sqrt{6}$

$-\sqrt{3^2\cdot 5}+2\sqrt{5}-\sqrt{2^2\cdot 5}-2\sqrt{6}$

$-3\sqrt{5}+2\sqrt{5}-2\sqrt{5}-2\sqrt{6}$

$-3\sqrt{5}-2\sqrt{6}$



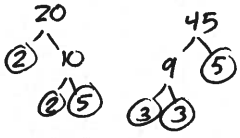
18) $2\sqrt{20}-\sqrt{20}+3\sqrt{20}-2\sqrt{45}$

$2\sqrt{2^2\cdot 5}-\sqrt{2^2\cdot 5}+3\sqrt{2^2\cdot 5}-2\sqrt{3^2\cdot 5}$

$2\cdot 2\sqrt{5}-2\sqrt{5}+3\cdot 2\sqrt{5}-2\cdot 3\sqrt{5}$

$4\sqrt{5}-2\sqrt{5}+6\sqrt{5}-6\sqrt{5}$

$2\sqrt{5}$

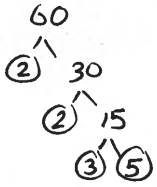


KEY

19) $\sqrt[3]{3} \cdot \sqrt[3]{-20}$

$\sqrt[3]{-60}$

$-\sqrt[3]{60}$



20) $\sqrt{5} \cdot \sqrt{3}$

$\sqrt{15}$

21) $3\sqrt{3}(4 - 3\sqrt{5})$

$12\sqrt{3} - 9\sqrt{5}$

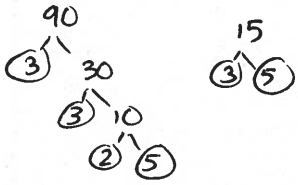
22) $4\sqrt{15}(-3\sqrt{6} + 5)$

$-12\sqrt{90} + 20\sqrt{15}$

$-12\sqrt{3^2 \cdot 2 \cdot 5} + 20\sqrt{3 \cdot 5}$

$-12 \cdot 3\sqrt{2 \cdot 5} + 20\sqrt{3 \cdot 5}$

$-36\sqrt{10} + 20\sqrt{15}$



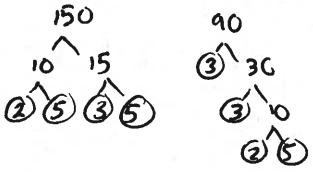
23) $\sqrt{15}(2\sqrt{10} - 4\sqrt{6})$

$2\sqrt{150} - 4\sqrt{90}$

$2\sqrt{2 \cdot 3 \cdot 5^2} - 4\sqrt{3^2 \cdot 2 \cdot 5}$

$2 \cdot 5\sqrt{2 \cdot 3} - 4 \cdot 3\sqrt{2 \cdot 5}$

$10\sqrt{6} - 12\sqrt{10}$



24) $(-7 + \sqrt{3x})(4 + \sqrt{3x})$

$-28 - 7\sqrt{3x} + 4\sqrt{3x} + 3x$

$-28 - 3\sqrt{3x} + 3x$ where $x \geq 0$

25) $(\sqrt{3} + \sqrt{5x})(\sqrt{3} - 5\sqrt{5x})$

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

$3 - 5\sqrt{15x} + \sqrt{15x} - 25x$

$3 - 4\sqrt{15x} - 25x$

26) $(7 + \sqrt{6})(1 + \sqrt{6})$

$7 + 7\sqrt{6} + 1\sqrt{6} + 6$

$13 + 8\sqrt{6}$

KEY

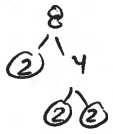
Simplify.

27) $\frac{\sqrt{15}}{5\sqrt{20}} = \frac{1}{5}\sqrt{\frac{15}{20}} = \frac{1}{5}\sqrt{\frac{3}{4}}$

$= \frac{1}{5}\frac{\sqrt{3}}{\sqrt{4}} = \frac{1\sqrt{3}}{5(2)} = \frac{\sqrt{3}}{10}$

28) $\frac{\sqrt{8}}{\sqrt{100}} = \frac{\sqrt{8}}{10} = \frac{\sqrt{2^2 \cdot 2}}{10}$

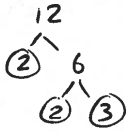
$= \frac{2\sqrt{2}}{10} = \frac{\sqrt{2}}{5}$



29) $\frac{4}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{4\sqrt{5}}{5}$

30) $\frac{\sqrt{4}}{5\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{12}}{5(3)} = \frac{\sqrt{2^2 \cdot 3}}{15}$

$= \frac{2\sqrt{3}}{15}$



31) $\frac{\sqrt{3x^2y^3}}{4\sqrt{5xy^3}} = \frac{1}{4}\sqrt{\frac{3x^2y^3}{5xy^3}} = \frac{1}{4}\sqrt{\frac{3x}{5}}$

$= \frac{\sqrt{3x}}{4\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{15x}}{4(5)} = \frac{\sqrt{15x}}{20}$

32) $\frac{\sqrt{15xy}}{3\sqrt{10xy^3}} = \frac{1}{3}\sqrt{\frac{15xy}{10xy^3}} = \frac{1}{3}\sqrt{\frac{3}{2y^2}}$

$= \frac{\sqrt{3}}{3\sqrt{2y^2}} = \frac{\sqrt{3}}{3y\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{6}}{3y(2)}$

$= \frac{\sqrt{6}}{6y}$

Key

33) $\dfrac{4x^3-3\sqrt{3x}}{3\sqrt{3x^2}} = \dfrac{4x^3-3\sqrt{3x}}{3\sqrt{3x^2}}$

$= \dfrac{(4x^3-3\sqrt{3x})}{(3x\sqrt{3})} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{4x^3\sqrt{3}-3(3)\sqrt{x}}{3x(3)}$

$= \dfrac{4x^3\sqrt{3}-9\sqrt{x}}{9x}$

34) $\dfrac{\sqrt{5k^4}+3\sqrt{2k}}{\sqrt{3k^3}} = \dfrac{(k^2\sqrt{5}+3\sqrt{2k})}{(k\sqrt{3k})} \cdot \dfrac{\sqrt{3k}}{\sqrt{3k}}$

$= \dfrac{k^2\sqrt{15k}+3\sqrt{6k^2}}{k(3k)} = \dfrac{k^2\sqrt{15k}+3k\sqrt{6}}{3k^2}$

$= \dfrac{k\sqrt{15k}+3\sqrt{6}}{3k}$

35) $\dfrac{(5)}{(-3-3\sqrt{3})} \cdot \dfrac{(-3+3\sqrt{3})}{(-3+3\sqrt{3})}$

$\dfrac{-15+15\sqrt{3}}{9-9\sqrt{3}+9\sqrt{3}-9(3)}$

$\dfrac{-15+15\sqrt{3}}{-18} = \dfrac{(-5+5\sqrt{3})}{(-6)} \cdot \dfrac{(-1)}{(-1)}$

$= \dfrac{5-5\sqrt{3}}{6}$

36) $\dfrac{(4)}{(\sqrt{2}-5\sqrt{3})} \cdot \dfrac{(\sqrt{2}+5\sqrt{3})}{(\sqrt{2}+5\sqrt{3})} = \dfrac{4\sqrt{2}+20\sqrt{3}}{2+5\sqrt{6}-5\sqrt{6}-25(3)}$

$= \dfrac{(4\sqrt{2}+20\sqrt{3})}{(-73)} \cdot \dfrac{(-1)}{(-1)} = \dfrac{-4\sqrt{2}-20\sqrt{3}}{73}$

37) $\dfrac{(\sqrt{5}+3)}{(4-\sqrt{5})} \cdot \dfrac{(4+\sqrt{5})}{(4+\sqrt{5})}$

$\dfrac{4\sqrt{5}+5+12+3\sqrt{5}}{16+4\sqrt{5}-4\sqrt{5}-5}$

$\dfrac{7\sqrt{5}+17}{11}$

38) $\dfrac{(3-4\sqrt{3})}{(4\sqrt{5}+3\sqrt{2})} \cdot \dfrac{(4\sqrt{5}-3\sqrt{2})}{(4\sqrt{5}-3\sqrt{2})}$

$\dfrac{12\sqrt{5}-9\sqrt{2}-16\sqrt{15}+12\sqrt{6}}{16(5)-12\sqrt{10}+12\sqrt{10}-9(2)}$

$\dfrac{12\sqrt{5}-9\sqrt{2}-16\sqrt{15}+12\sqrt{6}}{62}$