Pick any 10

13-3

NAME _____ DATE _____

Practice

Student Edition
Pages 727–731

Operations with Radical Expressions

Simplify. Then use a calculator to verify your answer.

1. $6\sqrt{5} - 2\sqrt{5} + 8\sqrt{5}$

$12\sqrt{5}$

2. $\sqrt{15} + 8\sqrt{15} - 12\sqrt{15}$

$-3\sqrt{15}$

3. $4\sqrt{3} + 2\sqrt{12}$

$8\sqrt{3}$

4. $8\sqrt{54} - 4\sqrt{6}$

$20\sqrt{6}$

5. $8\sqrt{32} - 4\sqrt{8}$

$24\sqrt{2}$

6. $2\sqrt{45} + 4\sqrt{20}$

$14\sqrt{5}$

7. $5\sqrt{128} + 2\sqrt{18}$

$46\sqrt{2}$

8. $3\sqrt{75} - \sqrt{243}$

$6\sqrt{3}$

9. $\sqrt{28} + \sqrt{63}$

$5\sqrt{7}$

10. $\sqrt{44} - \sqrt{11}$

$\sqrt{11}$

11. $\sqrt{27} + \sqrt{48} + \sqrt{12}$

$9\sqrt{3}$

12. $\sqrt{72} + \sqrt{50} - \sqrt{8}$

$9\sqrt{2}$

13. $\sqrt{180} - 5\sqrt{5} + \sqrt{20}$

$3\sqrt{5}$

14. $\sqrt{40} - \sqrt{10} + \sqrt{90}$

$4\sqrt{10}$

15. $2\sqrt{32} + 3\sqrt{50} - 3\sqrt{18}$

$14\sqrt{2}$

16. $\sqrt{27} + \sqrt{18} + \sqrt{300}$

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

17. $\sqrt{14} - \sqrt{\frac{2}{7}}$

$\frac{6\sqrt{14}}{7}$ or $\frac{6\sqrt{14}}{7}$

18. $\sqrt{50} + \sqrt{32} - \sqrt{\frac{1}{2}}$

$8.5\sqrt{2}$ or $\frac{17\sqrt{2}}{2}$

Operations with Radicals

1. $6\sqrt{5} - 2\sqrt{5} + 8\sqrt{5}$

$\boxed{12\sqrt{5}}$

2. $\sqrt{15} + 8\sqrt{15} - 12\sqrt{15}$

$-3\sqrt{15}$

3. $4\sqrt{3} + 2\sqrt{12}$

$4\sqrt{3} +$ (12 = 2 · 6, 6 = 2 · 3)

$4\sqrt{3} + 4\sqrt{3}$

$\boxed{18\sqrt{3}}$

4. $8\sqrt{54} - 4\sqrt{6}$

(54 = 2 · 27, 27 = 3 · 9, 9 = 3 · 3)

$24\sqrt{6} - 4\sqrt{6}$

$\boxed{20\sqrt{6}}$

5. $8\sqrt{32} - 4\sqrt{8}$

(32 = 2 · 16, 16 = 4 · 4; 8 = 2 · 4, 4 = 2 · 2)

$32\sqrt{2} - 8\sqrt{2}$

$\boxed{24\sqrt{2}}$

6. $2\sqrt{45} + 4\sqrt{20}$

(45 = 5 · 9, 9 = 3 · 3; 20 = 2 · 10, 10 = 2 · 5)

$6\sqrt{5} + 8\sqrt{5}$

$\boxed{14\sqrt{5}}$

7. $5\sqrt{128} + 2\sqrt{18}$

(128 = 2 · 64, 64 = 8 · 8; 18 = 2 · 9, 9 = 3 · 3)

$40\sqrt{2} + 6\sqrt{2} = \boxed{46\sqrt{2}}$

8. $3\sqrt{75} - \sqrt{243}$

(75 = 3 · 25, 25 = 5 · 5; 243 = 3 · 81, 81 = 9 · 9)

$15\sqrt{3} - 9\sqrt{3} = \boxed{6\sqrt{3}}$

9. $\sqrt{28} + \sqrt{63}$

(28 = 2 · 14, 14 = 2 · 7; 63 = 3 · 21, 21 = 3 · 7)

$2\sqrt{7} + 3\sqrt{7} = \boxed{5\sqrt{7}}$

10. $\sqrt{44} - \sqrt{11}$

(44 = 2 · 22, 22 = 2 · 11)

$2\sqrt{11} - \sqrt{11} = \boxed{\sqrt{11}}$

11. $\sqrt{27} + \sqrt{48} + \sqrt{12}$

(27 = 3 · 9, 9 = 3 · 3; 48 = 2 · 24, 24 = 2 · 12, 12 = 2 · 6, 6 = 2 · 3; 12 = 2 · 6, 6 = 2 · 3)

$3\sqrt{3} + 4\sqrt{3} + 2\sqrt{3} = \boxed{9\sqrt{3}}$

12. $\sqrt{72} + \sqrt{50} - \sqrt{8}$

(72 = 2 · 36, 36 = 2 · 18, 18 = 2 · 9, 9 = 3 · 3; 50 = 2 · 25, 25 = 5 · 5; 8 = 2 · 4, 4 = 2 · 2)

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

13. $\sqrt{180} - 5\sqrt{5} + \sqrt{20}$

$180 = 2 \cdot 90 = 2 \cdot 2 \cdot 45 = 2 \cdot 2 \cdot 5 \cdot 9 = 2 \cdot 2 \cdot 5 \cdot 3 \cdot 3$

$20 = 2 \cdot 10 = 2 \cdot 2 \cdot 5$

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

14. $\sqrt{40} - \sqrt{10} + \sqrt{90}$

$40 = 2 \cdot 20 = 2 \cdot 2 \cdot 10 = 2 \cdot 2 \cdot 2 \cdot 5$

$90 = 2 \cdot 45 = 2 \cdot 5 \cdot 9 = 2 \cdot 5 \cdot 3 \cdot 3$

$2\sqrt{10} - \sqrt{10} + 3\sqrt{10} = \boxed{4\sqrt{10}}$

15. $2\sqrt{32} + 3\sqrt{50} - 3\sqrt{18}$

$32 = 2 \cdot 16 = 2 \cdot 4 \cdot 4$

$50 = 2 \cdot 25 = 2 \cdot 5 \cdot 5$

$18 = 2 \cdot 9 = 2 \cdot 3 \cdot 3$

$8\sqrt{2} + 15\sqrt{2} - 9\sqrt{2} = \boxed{14\sqrt{2}}$

16. $\sqrt{27} + \sqrt{18} + \sqrt{300}$

$27 = 3 \cdot 9 = 3 \cdot 3 \cdot 3$

$18 = 2 \cdot 9 = 2 \cdot 3 \cdot 3$

$300 = 3 \cdot 100 = 3 \cdot 10 \cdot 10$

$3\sqrt{3} + 3\sqrt{2} + 10\sqrt{3}$

$\boxed{3\sqrt{2} + 13\sqrt{3}}$

17. $\sqrt{14} - \sqrt{\frac{2}{7}} = \sqrt{14} - \frac{\sqrt{2}}{\sqrt{7}}\left(\frac{\sqrt{7}}{\sqrt{7}}\right) = \sqrt{14} - \frac{\sqrt{14}}{7} = \frac{6\sqrt{14}}{7}$

$\Rightarrow (1\sqrt{14} - \frac{1}{7}\sqrt{14})$

18. $\sqrt{50} + \sqrt{32} - \sqrt{\frac{1}{2}}$

$50 = 2 \cdot 25 = 2 \cdot 5 \cdot 5$

$32 = 2 \cdot 16 = 2 \cdot 4 \cdot 4$

$5\sqrt{2} + 4\sqrt{2} - \frac{1}{\sqrt{2}}$

$9\sqrt{2} - \frac{1}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right)$

$9\sqrt{2} - \frac{\sqrt{2}}{2}$ OR $9\sqrt{2} - \frac{1}{2}\sqrt{2} = \boxed{8.5\sqrt{2}}$

$\boxed{\frac{17\sqrt{2}}{2}}$