

Name _____

Date _____

Additional Exercises 9.3
Form I
Operations with Radicals

Add or subtract as indicated. If terms are not like radicals and cannot be combined, so state.

1. $5\sqrt{6} + 3\sqrt{6}$ 1. _____

2. $12\sqrt{5} - 10\sqrt{5}$ 2. _____

3. $\sqrt{7} + \sqrt{7}$ 3. _____

4. $3\sqrt{10} - 7\sqrt{10}$ 4. _____

5. $2\sqrt{11y} + 4\sqrt{11y}$ 5. _____

6. $6\sqrt{3} + 2\sqrt{5}$ 6. _____

7. $8\sqrt{14} + \sqrt{14} + 4\sqrt{14}$ 7. _____

8. $9\sqrt{21} - \sqrt{21} - 3\sqrt{21}$ 8. _____

Add or subtract as indicated. You may need to simplify terms before they can be combined. If terms cannot be combined, so state.

9. $3\sqrt{8} + 4\sqrt{18}$ 9. _____

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10. $15\sqrt{20} - 10\sqrt{45}$ 10. _____

11. $6\sqrt{90x} - 3\sqrt{40x} - 2\sqrt{10x}$ 11. _____

12. $4\sqrt{6} + 2\sqrt{10}$ 12. _____

Multiply as indicated. Final answers may need to be simplified.

13. $6(\sqrt{3} - \sqrt{5})$ 13. _____

14. $\sqrt{3}(\sqrt{6} - \sqrt{3})$ 14. _____

15. $(4 + \sqrt{2})(2 + \sqrt{3})$ 15. _____

16. $(5 + \sqrt{5})(3 - \sqrt{5})$ 16. _____

17. $(\sqrt{6} - \sqrt{3})(\sqrt{6} + \sqrt{3})$ 17. _____

18. $(4 + \sqrt{6})(4 - \sqrt{6})$ 18. _____

19. $(\sqrt{3} + \sqrt{5})^2$ 19. _____

20. $(\sqrt{2} - \sqrt{x})^2$ 20. _____

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Additional Exercises 9.3
Form II
Operations with Radicals

Add or subtract as indicated. If terms are not like radicals and cannot be combined, so state.

1. $18\sqrt{10} - 7\sqrt{10}$ 1. _____

2. $5\sqrt{x} + 2\sqrt{x}$ 2. _____

3. $\sqrt{6} + \sqrt{6}$ 3. _____

4. $4\sqrt{3xy} - 5\sqrt{3xy}$ 4. _____

5. $\sqrt{5a} - \sqrt{5a}$ 5. _____

6. $10\sqrt{11x} - \sqrt{11x} + 3\sqrt{11x}$ 6. _____

7. $\sqrt{21ab} + 4\sqrt{21ab} - 8\sqrt{21ab}$ 7. _____

Add or subtract as indicated. You may need to simplify terms before they can be combined. If terms cannot be combined, so state.

8. $8\sqrt{12} + 3\sqrt{27} - \sqrt{27}$ 8. _____

9. $5\sqrt{44x} - 3\sqrt{99x} + 2\sqrt{11x}$ 9. _____

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10. $3y\sqrt{8y} + 3y\sqrt{18y} - 3y\sqrt{32y}$ 10. _____

11. $5xy\sqrt{45xy^2} - 2y^2\sqrt{20x^3} + 3xy^2\sqrt{5x}$ 11. _____

12. $7a\sqrt{12ab} + 3a\sqrt{3ab}$ 12. _____

Multiply as indicated. Final answers may need to be simplified.

13. $\sqrt{3}(8 - \sqrt{3})$ 13. _____

14. $\sqrt{5}(\sqrt{4} - \sqrt{5})$ 14. _____

15. $\sqrt{6}(\sqrt{6} - \sqrt{3})$ 15. _____

16. $(5 + \sqrt{5})(2 - \sqrt{10})$ 16. _____

17. $(\sqrt{7} - \sqrt{3})(\sqrt{7} + \sqrt{3})$ 17. _____

18. $(2\sqrt{3} + \sqrt{7})(3\sqrt{4} - \sqrt{3})$ 18. _____

19. $(\sqrt{11} - \sqrt{5})^2$ 19. _____

20. $(4\sqrt{10} + 2\sqrt{2})^2$ 20. _____

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Additional Exercises 9.3
Form III
Operations with Radicals

Add or subtract as indicated. If terms are not like radicals and cannot be combined, so state.

1. $-14\sqrt{17} + 8\sqrt{17}$ 1. _____

2. $7\sqrt{y} - 3\sqrt{y}$ 2. _____

3. $25\sqrt{5} - \sqrt{5}$ 3. _____

4. $8x\sqrt{2y} + 4x\sqrt{2y}$ 4. _____

5. $7\sqrt{3ab} - 2\sqrt{3ab} + \sqrt{3ab}$ 5. _____

6. $9a\sqrt{6} - 5\sqrt{6a}$ 6. _____

7. $12xy\sqrt{xy} - 10xy\sqrt{xy} + 15xy\sqrt{xy}$ 7. _____

Add or subtract as indicated. You may need to simplify terms before they can be combined. If terms cannot be combined, so state.

8. $5\sqrt{2} + 5\sqrt{18}$ 8. _____

9. $3\sqrt{27} - 5\sqrt{3} + 2\sqrt{27}$ 9. _____

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10. $\sqrt{48} + 2\sqrt{48} - 8\sqrt{3}$ 10. _____

11. $4\sqrt{32a^2} - 2\sqrt{8a^2} + a\sqrt{18}$ 11. _____

12. $7x^2y^3\sqrt[3]{8y^4} + 3y^3\sqrt{x^6y^4} - 2xy^3\sqrt{x^3y^4}$ 12. _____

Multiply as indicated. Final answers may need to be simplified.

13. $\sqrt{5}(\sqrt{5} - \sqrt{10})$ 13. _____

14. $\sqrt{2x}(\sqrt{3x} + \sqrt{12x})$ 14. _____

15. $(12 + \sqrt{6})(3 - \sqrt{6})$ 15. _____

16. $(\sqrt{5} + \sqrt{3})(\sqrt{6} - \sqrt{5})$ 16. _____

17. $(3\sqrt{6} + 4\sqrt{2})(3\sqrt{3} - 6\sqrt{2})$ 17. _____

18. $(2\sqrt{7} + 5\sqrt{6})(2\sqrt{7} - 5\sqrt{6})$ 18. _____

19. $(\sqrt{10} - \sqrt{15})^2$ 19. _____

20. $(8\sqrt{3} + 2\sqrt{6})^2$ 20. _____