Operations with Radicals Worksheet

ADDING AND SUBTRACTING RADICALS Simplify the expression.

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

19.
$$\sqrt{3} + 5\sqrt{3}$$

18.
$$5\sqrt{7} + 2\sqrt{7}$$
 19. $\sqrt{3} + 5\sqrt{3}$ **20.** $11\sqrt{3} - 12\sqrt{3}$ **18.** $5\sqrt{7} + 2\sqrt{7}$ **19.** $\sqrt{3} + 5\sqrt{3}$

21.
$$2\sqrt{6} - \sqrt{6}$$

22.
$$\sqrt{32} + \sqrt{2}$$

23.
$$\sqrt{75} + \sqrt{3}$$

24.
$$\sqrt{80} - \sqrt{45}$$

25.
$$\sqrt{72} - \sqrt{18}$$

26.
$$\sqrt{147} - 7\sqrt{3}$$

27.
$$4\sqrt{5} + \sqrt{125} + \sqrt{45}$$

28.
$$3\sqrt{11} + \sqrt{176} + \sqrt{11}$$

29.
$$\sqrt{24} - \sqrt{96} + \sqrt{6}$$

30.
$$\sqrt{243} - \sqrt{75} + \sqrt{300}$$

MULTIPLYING AND DIVIDING RADICALS Simplify the expression.

32.
$$\sqrt{5} \cdot \sqrt{8}$$

31.
$$\sqrt{3} \cdot \sqrt{12}$$
 32. $\sqrt{5} \cdot \sqrt{8}$ **33.** $(1 + \sqrt{13})(1 - \sqrt{13})$ **31.** $\sqrt{3} \cdot \sqrt{12}$ **32.** $\sqrt{5} \cdot \sqrt{8}$ **33.** $(1 + \sqrt{13})(1 - \sqrt{13})$

34.
$$\sqrt{3}(5\sqrt{2} + \sqrt{3})$$

35.
$$\sqrt{6}(7\sqrt{3}+6)$$

36.
$$(\sqrt{6} + 5)^2$$

37.
$$(\sqrt{a} - b)^2$$

37.
$$(\sqrt{a}-b)^2$$
 38. $(\sqrt{c}+d)(3+\sqrt{5})$ **39.** $(2\sqrt{3}-5)^2$ **37.** $(\sqrt{a}-b)^2$ **38.** $(\sqrt{c}+d)(3+\sqrt{5})$ **39.** $(2\sqrt{3}-5)^2$

39.
$$(2\sqrt{3}-5)^2$$

40.
$$\frac{5}{\sqrt{7}}$$

41.
$$\frac{2}{\sqrt{2}}$$

42.
$$\frac{9}{5-\sqrt{7}}$$

43.
$$\frac{3}{\sqrt{48}}$$

46.
$$\frac{14}{60 - \sqrt{578}}$$
 47. $\frac{12}{7 - \sqrt{3}}$ **48.** $\frac{4 + \sqrt{3}}{a - \sqrt{b}}$ **46.** $\frac{14}{60 - \sqrt{578}}$ **47.** $\frac{12}{7 - \sqrt{3}}$ **48.** $\frac{4 + \sqrt{3}}{a - \sqrt{b}}$

48.
$$\frac{4+\sqrt{3}}{a-\sqrt{6}}$$

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$$5\sqrt{7} + 2\sqrt{7}$$

19.
$$\sqrt{3} + 5\sqrt{3}$$

20.
$$11\sqrt{3} - 12\sqrt{3}$$

21.
$$2\sqrt{6} - \sqrt{6}$$

21.
$$2\sqrt{6} - \sqrt{6}$$
 22. $\sqrt{32} + \sqrt{2}$ **23.** $\sqrt{75} + \sqrt{3}$ **21.** $2\sqrt{6} - \sqrt{6}$ **22.** $\sqrt{32} + \sqrt{2}$ **23.** $\sqrt{75} + \sqrt{3}$

23.
$$\sqrt{75} + \sqrt{3}$$

24.
$$\sqrt{80} - \sqrt{45}$$

25.
$$\sqrt{72} - \sqrt{18}$$

24.
$$\sqrt{80} - \sqrt{45}$$
 25. $\sqrt{72} - \sqrt{18}$ **26.** $\sqrt{147} - 7\sqrt{3}$ **24.** $\sqrt{80} - \sqrt{45}$ **25.** $\sqrt{72} - \sqrt{18}$ **26.** $\sqrt{147} - 7\sqrt{3}$

27.
$$4\sqrt{5} + \sqrt{125} + \sqrt{45}$$

27.
$$4\sqrt{5} + \sqrt{125} + \sqrt{45}$$
 28. $3\sqrt{11} + \sqrt{176} + \sqrt{11}$ **27.** $4\sqrt{5} + \sqrt{125} + \sqrt{45}$ **28.** $3\sqrt{11} + \sqrt{176} + \sqrt{11}$

29.
$$\sqrt{24} - \sqrt{96} + \sqrt{6}$$

29.
$$\sqrt{24} - \sqrt{96} + \sqrt{6}$$
 30. $\sqrt{243} - \sqrt{75} + \sqrt{300}$ **29.** $\sqrt{24} - \sqrt{96} + \sqrt{6}$ **30.** $\sqrt{243} - \sqrt{75} + \sqrt{300}$

MULTIPLYING AND DIVIDING RADICALS Simplify the expression.

31.
$$\sqrt{3} \cdot \sqrt{12}$$

32.
$$\sqrt{5} \cdot \sqrt{8}$$

33.
$$(1 + \sqrt{13})(1 - \sqrt{13})$$

34.
$$\sqrt{3}(5\sqrt{2}+\sqrt{3})$$
 35. $\sqrt{6}(7\sqrt{3}+6)$ **36.** $(\sqrt{6}+5)^2$ **34.** $\sqrt{3}(5\sqrt{2}+\sqrt{3})$ **35.** $\sqrt{6}(7\sqrt{3}+6)$ **36.** $(\sqrt{6}+5)^2$

35.
$$\sqrt{6}(7\sqrt{3}+6)$$

36.
$$(\sqrt{6} + 5)^2$$

37.
$$(\sqrt{a} - b)^2$$

38.
$$(\sqrt{c} + d)(3 + \sqrt{5})$$

39.
$$(2\sqrt{3} - 5)^2$$

40.
$$\frac{5}{\sqrt{7}}$$

41.
$$\frac{2}{\sqrt{2}}$$

40.
$$\frac{5}{\sqrt{7}}$$
 41. $\frac{2}{\sqrt{2}}$ **42.** $\frac{9}{5-\sqrt{7}}$ **40.** $\frac{5}{\sqrt{7}}$ **41.** $\frac{2}{\sqrt{2}}$ **42.** $\frac{9}{5-\sqrt{7}}$

43.
$$\frac{3}{\sqrt{48}}$$

43.
$$\frac{3}{\sqrt{48}}$$
 44. $\frac{6}{10+\sqrt{2}}$ **45.** $\frac{\sqrt{3}}{\sqrt{3}-1}$ **43.** $\frac{3}{\sqrt{48}}$ **44.** $\frac{6}{10+\sqrt{2}}$ **45.** $\frac{\sqrt{3}}{\sqrt{3}-1}$

45.
$$\frac{\sqrt{3}}{\sqrt{3}-1}$$

46.
$$\frac{14}{60 - \sqrt{578}}$$

47.
$$\frac{12}{7-\sqrt{3}}$$

48.
$$\frac{4 + \sqrt{3}}{a - \sqrt{b}}$$