

A. Simplify the following, always expressing answers in simplest form.

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|--------------------------------------|--------------------------------------|--|--|-------------------------------|----------------------------|--------------------------------------|
| 1. $\sqrt{8bc} \times \sqrt{4bc}$ | 2. $3\sqrt{20} \times 6\sqrt{5}$ | 3. $5 \times 2\sqrt{6}$ | 4. $5\sqrt{10} \times \sqrt{4}$ | | | |
| 5. $\sqrt{5b} \times \sqrt{5b}$ | 6. $\sqrt{2a} \times \sqrt{6a}$ | 7. $\frac{1}{3}\sqrt{3} \times \sqrt{3}$ | 8. $\frac{1}{4}\sqrt{20} \times \frac{4}{5}\sqrt{5}$ | | | |
| 9. $\sqrt{ax} \times \sqrt{ax}$ | 10. $\sqrt{ab^3} \times \sqrt{ac^3}$ | 11. $\sqrt{6r^4} \times \sqrt{3rs^2}$ | 12. $\sqrt{2c^3} \times (-\sqrt{5cd})$ | | | |
| 13. $2m\sqrt{7mn} \times 3\sqrt{7m}$ | 14. $(\sqrt{5})^2$ | 15. $(4\sqrt{6})^2$ | 16. $3y\sqrt{6x^3y} \times 2x\sqrt{8xy^4}$ | | | |
| 17. $(-2\sqrt{x})^2$ | 18. $(x\sqrt{2a})^2$ | 19. $5^3\sqrt{45} \times 2^3\sqrt{3}$ | 20. $\sqrt[4]{18} \times \sqrt[4]{9}$ | | | |
| 21. $\sqrt[5]{486}$ | 22. $2(4\sqrt{2} + 1)$ | 23. $2(3\sqrt{12} - 5\sqrt{8})$ | 24. $\sqrt{2}(\sqrt{3} + 3)$ | | | |
| 25. $\sqrt{8}(2\sqrt{3} - 5)$ | 26. $\sqrt{6}(\sqrt{2} - \sqrt{12})$ | 27. $\sqrt{2}(3\sqrt{2} + \sqrt{18})$ | 28. $\sqrt{12}(2\sqrt{5} - 4\sqrt{2})$ | | | |
| 29. $(\sqrt{2} + 4)(\sqrt{2} - 4)$ | 30. $(2\sqrt{3} - 3)(2\sqrt{3} + 3)$ | 31. $(\sqrt{3} + 4)(\sqrt{3} + 2)$ | 32. $(5 + 3\sqrt{3})(5 + 3\sqrt{3})$ | | | |
| 33. $(2\sqrt{3} - 1)^2$ | 34. $(\sqrt{2} + \sqrt{3})^2$ | 35. $(5\sqrt{6} - 6\sqrt{5})^2$ | 36. $(6\sqrt{5} + \sqrt{7})(6\sqrt{5} - \sqrt{7})$ | | | |
| 37. $\sqrt{\frac{3}{4}}$ | 38. $\sqrt{\frac{15}{64}}$ | 39. $\sqrt{\frac{24}{25}}$ | 40. $\sqrt{2\frac{1}{4}}$ | 41. $\sqrt[3]{\frac{500}{4}}$ | 42. $\sqrt{\frac{d}{m^2}}$ | 43. $\sqrt{\frac{4x^2y}{121a^8b^6}}$ |

B. Simplify.

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|---|---|---|
| 1. $2\sqrt{36} + 2\sqrt{64} - 5\sqrt{12}$ | 2. $4\sqrt{75} + 8\sqrt{12} - 3\sqrt{48}$ | 3. $7\sqrt{120} - 3\sqrt{52} - 2\sqrt{28}$ |
| 4. $8\sqrt{24} + 3\sqrt{6} - 4\sqrt{54}$ | 5. $4\sqrt{243} + 2\sqrt{363} - 5\sqrt{49}$ | 6. $7\sqrt{45} + 4\sqrt{196} - 6\sqrt{125}$ |
| 7. $4\sqrt[3]{54} - 7\sqrt[3]{128} + 2\sqrt[3]{24}$ | 8. $5\sqrt[3]{375} + 2\sqrt[3]{192} - \sqrt[3]{24}$ | 9. $2\sqrt[4]{48} - \sqrt[4]{243}$ |

ANSWERS:**Part A:**

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|------------------------------|-----------------------------|---------------------------|------------------------------|-------------------------------|----------------------------|-----------------------------------|
| 1. $4bc\sqrt{2}$ | 2. 180 | 3. $10\sqrt{6}$ | 4. $10\sqrt{10}$ | 5. $5b$ | 6. $2a\sqrt{3}$ | |
| 7. 1 | 8. 2 | 9. ax | 10. $abc\sqrt{bc}$ | 11. $3r^2s\sqrt{2r}$ | 12. $-c^2\sqrt{10d}$ | |
| 13. $42m^2\sqrt{n}$ | 14. 5 | 15. 96 | 16. $24x^3y^3\sqrt{3y}$ | 17. $4x$ | 18. $2ax^2$ | |
| 19. $30\sqrt[3]{5}$ | 20. $3\sqrt[4]{2}$ | 21. $3\sqrt[5]{2}$ | 22. $8\sqrt{2} + 2$ | 23. $12\sqrt{3} - 20\sqrt{2}$ | 24. $\sqrt{6} + 3\sqrt{2}$ | |
| 25. $4\sqrt{6} - 10\sqrt{2}$ | 26. $2\sqrt{3} - 6\sqrt{2}$ | 27. 12 | 28. $4\sqrt{15} - 8\sqrt{6}$ | 29. -14 | 30. 3 | |
| 31. $6\sqrt{3} + 11$ | 32. $52 + 30\sqrt{3}$ | 33. $13 - 4\sqrt{3}$ | 34. $5 + 2\sqrt{6}$ | 35. $330 - 60\sqrt{30}$ | 36. 173 | |
| 37. $\frac{\sqrt{3}}{2}$ | 38. $\frac{\sqrt{15}}{8}$ | 39. $\frac{2\sqrt{6}}{5}$ | 40. $\frac{3}{2}$ | 41. 5 | 42. $\frac{\sqrt{d}}{m}$ | 43. $\frac{2x\sqrt{y}}{11a^4b^3}$ |

Part B:

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| 1. $28 - 10\sqrt{3}$ | 2. $24\sqrt{3}$ | 3. $14\sqrt{30} - 6\sqrt{13} - 4\sqrt{7}$ | 4. $7\sqrt{6}$ | 5. $58\sqrt{3} - 35$ |
| 6. $56 - 9\sqrt{5}$ | 7. $-16\sqrt[3]{2} + 4\sqrt[3]{3}$ | 8. $31\sqrt[3]{3}$ | 9. $\sqrt[4]{3}$ | |