Name_____ Date_____ Period_____

OPERATIONS WITH RADICALS WORKSHEET

Properties: 1) $\sqrt[n]{ab} = \sqrt[n]{a}\sqrt[n]{b}$ 2) $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$ 3) $\sqrt[n]{\sqrt[m]{a}} = \sqrt[nm]{a}$ 4) $\sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$ 5) $\sqrt[n]{a^n} = a$

Perform the indicated operation, writing your answers in simplified form. Rationalize the denominator when necessary. Assume all variables are positive.

1. $2\sqrt{50} + 12\sqrt{8}$

2. $10\sqrt{32} - 6\sqrt{18}$

3. $\sqrt[3]{16} + 3\sqrt[3]{54}$

4. $5\sqrt{x^5} - 3\sqrt{x^5}$

5. $7\sqrt{80x^3} - 2\sqrt{125x^3}$

6. $-\sqrt[4]{x^3 - 7} + 5\sqrt[4]{x^3 - 7}$

7. $2\sqrt{12} \cdot 3\sqrt{5}$

8. $(3\sqrt[3]{2})(5\sqrt[3]{6})(8\sqrt[3]{4})$

9. $(\sqrt[3]{18x^2})(\sqrt[3]{2x})$

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

11. $(3\sqrt{2} - 4\sqrt{5})(2\sqrt{3} + 3\sqrt{6})$

12. $\sqrt{2} \cdot \sqrt[3]{2}$

13. $\sqrt[3]{x^2y}(\sqrt{xy} - \sqrt[5]{xy^3})$

14. $\frac{1}{\sqrt{3}}$

15. $\frac{5}{\sqrt{10}}$

16. $\frac{\sqrt[3]{4}}{\sqrt[3]{5}}$

17. $\frac{2}{5-\sqrt{3}}$

18. $\frac{3}{\sqrt{5}+\sqrt{6}}$

19. $\frac{2+\sqrt{5}}{1-\sqrt{7}}$

20. $\frac{\sqrt[3]{2xy^3}}{\sqrt{8x}}$

21. $\frac{\sqrt[4]{a^4b^2}}{\sqrt[3]{a^2b}}$

22. $\frac{\sqrt{ab}}{\sqrt[3]{ab}}$

23. $y\sqrt[4]{32x^6} + \sqrt[4]{162x^2y^4}$

24. $\sqrt[6]{\frac{81}{4}}$