7-5 nth Roots & Operations with Radicals

Name Master ☺

Date ____ Block ____

PROPERTIES OF RADICALS: Simplify each expression. Solutions must be expressed using simplified radical form (i.e., exact values only, no decimals).

1. $\sqrt{5} \bullet \sqrt{7}$

$\sqrt{35}$

2. $\sqrt{3} \bullet \sqrt{11}$

$\sqrt{33}$

3. $\sqrt{10} \bullet \sqrt{5}$

$\sqrt{50}$

$\sqrt{25} \cdot \sqrt{2}$

$5\sqrt{2}$

4. $\sqrt{12} \bullet \sqrt{6}$

$\sqrt{6 \cdot 2 \cdot 6}$

A) ~~$2\sqrt{6}$~~ C) $\sqrt{72}$

B) $6\sqrt{2}$ D) $\sqrt{18}$

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

$\sqrt[3]{4 \cdot 16} = \sqrt[3]{2^2 \cdot 2^4}$

$\sqrt[3]{64}$ $\sqrt[3]{2^6}$

$\boxed{4}$

6. $\sqrt[3]{9} \cdot \sqrt[3]{15}$

$\sqrt[3]{3^2 \cdot 3 \cdot 5}$ $3\sqrt[3]{5}$

A) $3\sqrt[3]{5}$ C) $\sqrt[3]{45}$

B) $27\sqrt[3]{5}$ D) $\sqrt[3]{24}$

7. $5\sqrt[3]{3} \bullet \sqrt[3]{9}$

$5\sqrt[3]{27}$ $5 \cdot 3 = \boxed{15}$

COMBINING ROOTS ("Like" radical expressions have the same *indices* AND the same *radicands*.) Simplify each expression. Assume that all variables represent positive values. Solutions must be expressed using simplified radical form (i.e., exact values only, no decimals).

8. $5\sqrt[3]{4} + \sqrt[3]{4}$

$\boxed{6\sqrt[3]{4}}$

9. $6\sqrt{5} - 10\sqrt{5}$

A) ~~$-60\sqrt{5}$~~ C) -4

B) $-4\sqrt{5}$ D) $16\sqrt{5}$

10. $7\sqrt{5} - 4\sqrt{3}$

11. $2\sqrt[4]{3} + 7\sqrt[4]{3}$

$9\sqrt[4]{3}$

12. $5\sqrt{3} - \sqrt{27}$ $\sqrt{9} \cdot \sqrt{3}$

$5\sqrt{3} - 3\sqrt{3}$

$2\sqrt{3}$

13. $\sqrt{24} + 2\sqrt{150}$

$2\sqrt{6} + 2\sqrt{25 \cdot 6}$

$2\sqrt{6} + 10\sqrt{6}$

$12\sqrt{6}$

14. $4\sqrt{27} + 3\sqrt{3} - \sqrt{48}$

$4\sqrt{9 \cdot 3}$ $-\sqrt{16 \cdot 3}$

$12\sqrt{3} + 3\sqrt{3} - 4\sqrt{3}$

A) ~~$6\sqrt{3}$~~ C) $6\sqrt{18}$

B) $11\sqrt{3}$ D) $7\sqrt{2}$

15. $\sqrt[3]{189} + \sqrt[3]{7}$

$\sqrt[3]{27 \cdot 7} + \sqrt[3]{7}$

$3\sqrt[3]{7} + \sqrt[3]{7}$

$\boxed{4\sqrt[3]{7}}$

16. $\sqrt[3]{x^5y^4} + 2y\sqrt[3]{x^5y}$

$xy\sqrt[3]{x^2y} + 2xy\sqrt[3]{x^2y}$

$\boxed{3xy\sqrt[3]{x^2y}}$

17. $\sqrt{25x^2y^5z^4} + xyz\sqrt{49y^3z^2}$

$5xy^2z^2\sqrt{y} + 7yz \cdot xyz\sqrt{y}$

$5xy^2z^2\sqrt{y} + 7xy^2z^2\sqrt{y}$

A) $35xyz\sqrt{xy}$ C) $12xy^2z^2\sqrt{y}$

B) $12xyz\sqrt{xy^2z}$ D) $12x^2y^2z^2$

$12xy^2z^2\sqrt{y}$

More Practice: Simplify each expression. Assume that all variables represent positive values. Solutions must be expressed using simplified radical form (i.e., exact values only, no decimals).

18. $\sqrt{49x^2y^5}$

$7xy^2\sqrt{y}$

19. $\sqrt[4]{32x^5y^8}$

$\sqrt[4]{16\cdot 2x^4xy^8}$

$2xy^2\sqrt[4]{2x}$

20. $\sqrt[3]{\frac{5}{27}}$

$\frac{\sqrt[3]{5}}{3}$

21. $\sqrt[3]{-8a^4b^3c^6}$

$-2abc^2\sqrt[3]{a}$

22. $\sqrt[4]{\frac{2}{3}}\cdot\frac{\sqrt[4]{3^3}}{\sqrt[4]{3^3}}$

$\frac{\sqrt[4]{2\cdot 27}}{3}=\frac{\sqrt[4]{54}}{3}$

23. $\sqrt{50x^3y^2}$

$5xy\sqrt{2x}$

24. $\sqrt[3]{\frac{1}{64}}$

$\frac{1}{4}$

25. $3\sqrt{27}-5\sqrt{3}+2\sqrt{48}$ 16·3

$9\sqrt{3}-5\sqrt{3}+8\sqrt{3}$

$12\sqrt{3}$

26. $\sqrt{x^2-10x+25}$

$x-5$

27. $7\sqrt[3]{24x^2}+\sqrt[3]{81x^2}$

$7\sqrt[3]{8\cdot 3x^2}+\sqrt[3]{27\cdot 3x^2}$

$14\sqrt[3]{3x^2}+3\sqrt[3]{3x^2}$

$17\sqrt[3]{3x^2}$

28. $\frac{15}{2\sqrt{5}}\cdot\frac{\sqrt{5}}{\sqrt{5}}$ $\frac{15\sqrt{5}}{10}$

$\frac{3\sqrt{5}}{2}$

29. $\sqrt{15}\bullet\sqrt{3}$

3·5·3

$3\sqrt{5}$

30. $\sqrt{6}\bullet\sqrt{8}$

$\sqrt{16\cdot 3}$

$4\sqrt{3}$

31. $\sqrt{12}\bullet\sqrt{24}$

$\sqrt{12\cdot 12\cdot 2}$

$12\sqrt{2}$

32. $\sqrt{11}\bullet\sqrt{33}$

$11\sqrt{3}$

33. $\sqrt{2}\bullet\sqrt{40}$

2·2·4·5

2·2

$4\sqrt{5}$

34. $\sqrt{2}\bullet\sqrt{32}$

2·2·16

8

35. $\sqrt[3]{3}\bullet\sqrt[3]{9}$

$\sqrt[3]{27}$

3

36. $\sqrt[3]{4}\bullet\sqrt[3]{32}$

$\sqrt[3]{128}$

$\sqrt[3]{64\cdot 2}=4\sqrt[3]{2}$

A) $64\sqrt[3]{2}$ C) $2\sqrt[3]{32}$

B) $4\sqrt[3]{2}$ D) $\sqrt[3]{128}$

37. $\sqrt[3]{4}\bullet 3\sqrt[3]{16}$

$3\sqrt[3]{64}$

$3\cdot 4=12$

38. $2\sqrt[3]{3}\bullet\sqrt[3]{36}$

$2\sqrt[3]{108}$

$2\sqrt[3]{27\cdot 4}$

$6\sqrt[3]{4}$

39. $\sqrt[3]{10}\bullet\sqrt[3]{100}$

$\sqrt[3]{1000}$

10

40. $\sqrt[3]{-3}\bullet\sqrt[3]{9}$

$\sqrt[3]{-27}$

-3

41. $4\sqrt[3]{9}\bullet\sqrt[3]{-9}$

$4\sqrt[3]{-27\cdot 3}$

$-12\sqrt[3]{3}$

42. $\sqrt[3]{25}\bullet 7\sqrt[3]{5}$

$7\sqrt[3]{125}$

7·5

35

43. $\sqrt[3]{3}\bullet\sqrt[3]{72}$

$\sqrt[3]{216}$

6

44. $\sqrt[3]{3}\bullet 5\sqrt[3]{18}$

$5\sqrt[3]{54}$

$5\sqrt[3]{27\cdot 2}$

$15\sqrt[3]{2}$

45. $11\sqrt[3]{4}\bullet\sqrt[3]{10}$

$11\sqrt[3]{40}$

$11\sqrt[3]{8\cdot 5}$

$22\sqrt[3]{5}$