

Name KEY

Show your work on all problems, and leave your solutions in the simplest form possible.

Perform the operations, and simplify, if possible.

$$1. \sqrt{\frac{49x^7}{y^4}} = \frac{\sqrt{49x^7}}{\sqrt{y^4}} = \frac{7x^3\sqrt{x}}{y^2} \checkmark$$

$$2. \sqrt[3]{5} \cdot \sqrt[3]{2} = \sqrt[3]{10} \checkmark$$

$$3. \sqrt{x^5y^4} = x^2y^2\sqrt{x} \checkmark$$

$$4. \sqrt[3]{27x^8z^6} = 3x^2z^2\sqrt[3]{x^2} \checkmark$$

$$5. \sqrt{3} \cdot (2\sqrt{5} - 3\sqrt{4}) = 2\sqrt{15} - 3\sqrt{12} \\ = 2\sqrt{15} - 3\sqrt{4 \cdot 3} \\ = 2\sqrt{15} - 6\sqrt{3}$$

$$6. (\sqrt{x} + \sqrt{y})(2\sqrt{x} - \sqrt{y}) \\ = 2x - \sqrt{xy} + 2\sqrt{xy} - y \\ = 2x + \sqrt{xy} - y$$

Rationalize the following expressions, and simplify if possible

$$7. \sqrt{\frac{3}{5y}} = \frac{\sqrt{3}}{\sqrt{5y}} \cdot \frac{\sqrt{5y}}{\sqrt{5y}} \\ = \frac{\sqrt{15y}}{5y}$$

$$8. \frac{4}{\sqrt{3}+1} \cdot \frac{\sqrt{3}-1}{\sqrt{3}-1} = \frac{4(\sqrt{3}-1)}{3-1} \\ = \frac{4(\sqrt{3}-1)}{2} = 2(\sqrt{3}-1)$$

$$9. \frac{\sqrt{3}-\sqrt{5}}{\sqrt{3}+\sqrt{5}} \cdot \frac{\sqrt{3}-\sqrt{5}}{\sqrt{3}-\sqrt{5}} \\ = \frac{3 - 2\sqrt{15} + 5}{(\sqrt{3})^2 - (\sqrt{5})^2} \\ = \frac{8 - 2\sqrt{15}}{3 - 5} \\ = \frac{8 - 2\sqrt{15}}{-2} = -4 + \sqrt{15}$$

$$10. \frac{\sqrt[3]{3}+1}{\sqrt[3]{9}} \cdot \frac{\sqrt[3]{9^2}}{\sqrt[3]{9^2}}$$

$$\frac{\sqrt[3]{3 \cdot 9^2} + \sqrt[3]{9^2}}{9} = \frac{\sqrt[3]{3^5} + \sqrt[3]{3^4}}{9} \\ = \frac{\sqrt[3]{3^4} + \sqrt[3]{3}}{9} \\ = \frac{\sqrt[3]{3^4} + \sqrt[3]{3}}{3}$$