Name _____ Date _____

Mr. Schlansky Algebra II

Fractional Exponents Regents Practice

For Multiple Choice, Use Multiple Choice Strategy!!!!!!

1. The expression $\sqrt[4]{81x^8y^6}$ is equivalent to

1) $3x^2y^{\frac{3}{2}}$

2) $3x^4y^2$

3) $9x^2y^{\frac{3}{2}}$

4) $9x^4y^2$

2. When $b > 0$ and d is a positive integer, the expression $(3b)^{\frac{2}{d}}$ is equivalent to

1) $\frac{1}{\left(\sqrt[d]{3b}\right)^2}$ 2) $\left(\sqrt{3b}\right)^d$ 3) $\frac{1}{\sqrt{3b^d}}$ 4) $\left(\sqrt[d]{3b}\right)^2$

3. Given $y > 0$, the expression $\sqrt{3x^2y} \bullet \sqrt[3]{27x^3y^2}$ is equivalent to

1) $81x^5y^3$

2) $3^{1.5}x^2y$

3) $3^{\frac{5}{2}}x^2y^{\frac{5}{3}}$

4) $3^{\frac{3}{2}}x^2y^{\frac{7}{6}}$

4. The expression $\left(\frac{m^2}{m^{\frac{1}{3}}}\right)^{-\frac{1}{2}}$ is equivalent to

1) $-\sqrt[6]{m^5}$

2) $\frac{1}{\sqrt[6]{m^5}}$

3) $-m^5\sqrt{m}$

4) $\frac{1}{m^5\sqrt{m}}$

5. What does $\left(\frac{-54x^9}{y^4}\right)^{\frac{2}{3}}$ equal?

1) $\frac{9ix^6\sqrt[3]{4}}{y\sqrt[3]{y^2}}$ 2) $\frac{9ix^6\sqrt[3]{4}}{y^2\sqrt[3]{y^2}}$ 3) $\frac{9x^6\sqrt[3]{4}}{y\sqrt[3]{y}}$ 4) $\frac{9x^6\sqrt[3]{4}}{y^2\sqrt[3]{y^2}}$

6. For $x > 0$, which expression is equivalent to $\frac{\sqrt[3]{x^2} \cdot \sqrt{x^5}}{\sqrt[6]{x}}$?

1) x
2) $x^{\frac{3}{2}}$
3) x^3
4) x^{10}

7. For positive values of x, which expression is equivalent to $\sqrt{16x^2} \cdot x^{\frac{2}{3}} + \sqrt[3]{8x^5}$

1) $6\sqrt[3]{x^5}$
2) $6\sqrt[5]{x^3}$
3) $4\sqrt[3]{x^2} + 2\sqrt[3]{x^5}$
4) $4\sqrt{x^3} + 2\sqrt[5]{x^3}$

8. For $x \geq 0$, which equation is *false*?

1) $(x^{\frac{3}{2}})^2 = \sqrt[4]{x^3}$
2) $(x^3)^{\frac{1}{4}} = \sqrt[4]{x^3}$
3) $(x^{\frac{3}{2}})^{\frac{1}{2}} = \sqrt[4]{x^3}$
4) $(x^{\frac{2}{3}})^2 = \sqrt[3]{x^4}$

9. For $x \neq 0$, which expressions are equivalent to one divided by the sixth root of x?

I. $\frac{\sqrt[6]{x}}{\sqrt[3]{x}}$ II. $\frac{x^{\frac{1}{6}}}{x^{\frac{1}{3}}}$ III. $x^{\frac{-1}{6}}$

1) I and II, only
2) I and III, only
3) II and III, only
4) I, II, and III

10. Explain what a rational exponent, such as $\frac{5}{2}$ means. Use this explanation to evaluate $9^{\frac{5}{2}}$.

11. Explain how $125^{\frac{4}{3}}$ can be evaluated using properties of rational exponents to result in an integer answer.

12. Explain how $(-8)^{\frac{4}{3}}$ can be evaluated using properties of rational exponents to result in an integer answer.

13. Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.

14. Kenzie believes that for $x \geq 0$, the expression $\left(\sqrt[7]{x^2}\right)\left(\sqrt[5]{x^3}\right)$ is equivalent to $\sqrt[35]{x^6}$. Is she correct? Justify your response algebraically.

15. Justify why $\frac{\sqrt[3]{x^2y^5}}{\sqrt[4]{x^3y^4}}$ is equivalent to $x^{\frac{-1}{12}}y^{\frac{2}{3}}$ using properties of rational exponents, where $x \neq 0$ and $y \neq 0$.

16. For n and $p > 0$, is the expression $\left(p^2n^{\frac{1}{2}}\right)^8\sqrt{p^5n^4}$ equivalent to $p^{18}n^6\sqrt{p}$? Justify your answer.

17. Use the properties of rational exponents to determine the value of y for the equation:
$\frac{\sqrt[3]{x^8}}{\left(x^4\right)^{\frac{1}{3}}} = x^y,\ x > 1$

18. Express the fraction $\frac{2x^{\frac{3}{2}}}{\left(16x^4\right)^{\frac{1}{4}}}$ in simplest radical form.