Name:_____ Period:_____

P2 Radicals and Rational Exponents Practice

Simplify each expression. Write your final answer with rational exponents.

1) $-5(-2)^2 \cdot \left(-\frac{2^3}{4^2}\right) = -5(4)\left(-\frac{8}{16}\right) = +10$

2) $\sqrt[5]{-96x^{-10}y^{13}} = \sqrt[5]{\frac{-96y^{13}}{x^{10}}} = \frac{-2y^2\sqrt[5]{3y^3}}{x^2}$

96
1
3 48
2 24
2 12
2 6
2 3

3) $\frac{(216a^3b^9)^{2/3}}{(81a)^{3/4}b^5}$ $\frac{216^{2/3}a^2b^6}{81^{3/4}a^{3/4}b^5} = \frac{36a^{5/4}b}{27} = \frac{4a^{5/4}b}{3}$

1024
2 512
2 256
2 128
2 64
2 32
2 16
2 8
2 4
2 2
2 1

4) $\sqrt[2]{\sqrt[5]{1024x^{17}}} = \sqrt[10]{1024x^{17}} = 2x\sqrt[10]{x^7}$

5) $\left(\frac{9^{3/2}a^{-7/2}b^{1/3}c^{11/6}}{3^{5/3}a^{2/3}b^{-9/2}c^2}\right)^{12} = \frac{(3^2)^{18}a^{-42}b^4c^{22}}{3^{20}a^8b^{-54}c^{24}} = \frac{3^{36}a^{-42}b^4c^{22}}{3^{20}a^8b^{-54}c^{24}} = \frac{3^{16}b^{58}}{a^{50}c^2}$

6) $\sqrt{4\sqrt[3]{64x^{12}\sqrt[5]{x^{18}y^{15}}}}$ $2\sqrt[6]{64x^{12}\sqrt[5]{x^{18}y^{15}}} = 2(2x^2\sqrt[30]{x^{18}y^{15}})$

$4x^2x^{18/30}y^{15/30} = 4x^{13/5}y^{1/2}$

Evaluate each expression with a calculator.

7) $\sqrt[4]{243x^{10}y^{12}}$ $3x^2y^3\sqrt{3x^2}$

8) $\left(\frac{-8}{125}\right)^{-2/3} = \frac{-8^{-2/3}}{125^{-2/3}}$ $\frac{125^{2/3}}{-8^{2/3}} = \frac{5^2}{(-2)^2} = \frac{25}{4}$

9) $\left(\frac{16x^{11}y^2}{81x^3y^{-2}}\right)^{5/4} = \frac{32x^{55/4}y^{10/4}}{243x^{15/4}y^{-10/4}}$ $\frac{32x^{10}}{243y^5}$

Rationalize each expression.

10) $\frac{14}{\sqrt{2}-\sqrt{7}}$ $\frac{\sqrt{2}+\sqrt{7}}{\sqrt{2}+\sqrt{7}}$

$\frac{14(\sqrt{2}+\sqrt{7})}{2-7} = \frac{14(\sqrt{2}+\sqrt{7})}{-5}$

11) $\frac{30}{\sqrt{5}+\sqrt{3}}$ $\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}} = \frac{30(\sqrt{5}-\sqrt{3})}{2}$

$15(\sqrt{5}-\sqrt{3})$

12) $\frac{12}{\sqrt[4]{12a^3b}}$ $\frac{\sqrt[4]{4\cdot 9\,ab^3}}{\sqrt[4]{2^2\cdot 3^3 ab^3}} = \frac{12\sqrt[4]{36ab^3}}{6ab}$

$2^2 3\,a^3 b$

$\frac{2\sqrt[4]{36ab^3}}{ab}$

13) $\frac{5}{\sqrt[3]{4ab^5}}$ $\frac{\sqrt[3]{2a^2b}}{\sqrt[3]{2a^2b}} = \frac{5\sqrt[3]{2a^2b}}{2ab^2}$

Simplify each expression.

14) $\sqrt{2}+\sqrt{3}+\sqrt{4}+\sqrt{8}+\sqrt{9}+\sqrt{12}+\sqrt{16}+\sqrt{20}$

$+2 + 2\sqrt{2} + 3 + 2\sqrt{3} + 4 + 2\sqrt{5}$

$= 3\sqrt{2} + 3\sqrt{3} + 9 + 2\sqrt{5}$

15) $2\sqrt[3]{24a^4}+6a\sqrt[3]{81a}-3a\sqrt[3]{3a}$

$4a\sqrt[3]{3a} + 18a\sqrt[3]{3a} - 3a\sqrt[3]{3a}$

$19a\sqrt[3]{3a}$

16) $2\sqrt{(x+y)^2}+\sqrt{(x+y)^4}+(x+y)$

$2(x+y) + (x+y)^2 + (x+y)$

$3(x+y) + (x+y)^2$