

Pre-Calculus 11: Radicals Quiz #2

Full credit will only be awarded for all work shown in a neat and organized manner.

1. Simplify each expression. Assume all variables are positive.

a. $(2x^3\sqrt{12x^2y^4})(3^3\sqrt{2x^5y^5})$

$$= 6x^3\sqrt{24x^7y^9}$$

$$= \boxed{12x^3y^3\sqrt{3x}}$$



b. $(\sqrt{18} - 2\sqrt{6})^2$

$$(\sqrt{18} - 2\sqrt{6})(\sqrt{18} - 2\sqrt{6})$$

$$= 18 + 4\sqrt{36} - 2\sqrt{108} - 2\sqrt{108}$$

$$= 18 + 24 - 4\sqrt{108}$$

$$= \boxed{42 - 24\sqrt{3}}$$



2. Simplify each expression and answer with a radical. Assume all variables are positive.

a. $\frac{\sqrt[5]{a^6}}{\sqrt[7]{a^7}} = \frac{a^{6/5}}{a^{7/7}}$

$$= a^{6/5 - 1} = a^{2/5 - 35/20}$$

$$= a^{-11/20} = \boxed{\frac{1}{20\sqrt[20]{a^{11}}}}$$

b. $\sqrt[3]{x^5} \cdot \sqrt{x^7}$

$$= x^{5/3} \cdot x^{7/2} = x^{10/6 + 7/6}$$

$$= x^{31/6} = \sqrt[6]{x^{31}} = \boxed{x^5\sqrt[6]{x}}$$

3. Rationalize the denominator and simplify. Assume all variables are positive.

a. $\frac{\sqrt[4]{4}}{\sqrt{x}} \cdot \frac{\sqrt[4]{x^3}}{\sqrt[4]{x^3}}$

$$= \boxed{\frac{\sqrt[4]{4x^3}}{x}}$$

b. $\frac{\sqrt{14}+1}{-4-\sqrt{2}} \cdot \frac{-4+\sqrt{2}}{-4+\sqrt{2}}$

$$= \frac{-4\sqrt{14} - 4 + \sqrt{28} + \sqrt{2}}{16 - 2}$$

$$= \boxed{\frac{-4\sqrt{14} - 4 + 2\sqrt{7} + \sqrt{2}}{14}}$$

4. Solve each equation and verify your solutions.

a. $-2\sqrt[4]{x-1} = 4$

$$\sqrt[4]{x-1} = -2$$

$$x-1 = (-2)^4$$

$$x = 1 + 16$$

$$x = 17$$

Check: $x=17$

$$-2\sqrt[4]{17-1} = 4$$

$$-2\sqrt[4]{16} = 4$$

$$-2 \cdot 2 = 4$$

$$-4 \neq 4$$

No answer

b. $\sqrt{2x-5} = 2x-7$

$$\sqrt{2x-5} = 2x-7$$

$$2x-5 = 4x^2 + 49 - 28x$$

$$0 = 4x^2 - 30x + 54$$

$$x = \frac{-(-30) \pm \sqrt{(-30)^2 - 4(4)(54)}}{2(4)}$$

$$x = \frac{30 \pm \sqrt{36}}{8}$$

$$x = \frac{30 \pm 6}{8} = 4.5, 3$$

Check $x=4.5$

$$\sqrt{2(4.5)-5} = 2(4.5)-7$$

$$\sqrt{4} = 2$$

$$2 = 2 \checkmark$$

Check $x=3$

$$\sqrt{2(3)-5} = 2(3)-7$$

$$\sqrt{1} \neq -1$$