

Operating with Radical Expressions Homework

Directions: Be sure to show all work, communicate your thought process, and justify your reasoning. Remember to check that your answers are complete, correct, and reasonable.

Perform each operation. Express your answers in simplest radical form.

1. $\sqrt{25k^4} - 5\sqrt{k^3} - 10\sqrt{k}$

2. $4\sqrt{b}(2\sqrt{bcd^2} - \sqrt{9c^3})$

3. $8\sqrt{12x^3z} * -2\sqrt{3x^8z} * \sqrt{xz}$

4. $5\sqrt{m}(\sqrt[3]{m^4} - 3\sqrt[3]{m^2})$

5. $\frac{9\sqrt{r^8s^{27}}}{\sqrt[3]{r^2s^{30}}}$

6. $\sqrt{72d} - \sqrt{cd} + 3\sqrt{2d} - 8\sqrt{cd}$

7. $\sqrt[7]{s^4}(\sqrt[7]{-128s} - 4\sqrt[7]{s^{10}})$

8. $\sqrt[3]{y^4z^5}(\sqrt{y^6} + \sqrt{z^7})$

9. $\sqrt[5]{uq}(\sqrt[5]{u^2} + 2\sqrt[5]{q^3})$

10. $\frac{\sqrt[4]{162x^{17}y^8}}{\sqrt[4]{2x^3y^3}}$

11. $\frac{\sqrt[3]{81x^{21}y^{15}}}{\sqrt[3]{3x^3y^2}}$

12. $\frac{26\sqrt{f^5d^3}}{4\sqrt[3]{fd}}$

Selected Solutions:

$$1) \sqrt{25x^4 - 5\sqrt{x^3} - 10\sqrt{x}} = \frac{5x^2 - 5x\sqrt{x} - 10\sqrt{x}}{5x^2 - (5x + 10)\sqrt{x}}$$

$$3) 8\sqrt{12x^3z^* - 2\sqrt{3x^2z}} * \sqrt{xz} = -16\sqrt{36x^{18}z^3} = -16(6)x^6z\sqrt{z}$$

$$5) \frac{9\sqrt{r^8s^{17}}}{3\sqrt{r^{28}s^{30}}} = \frac{9r^4s^{27/2}}{r^{14/3}s^{10}} = \frac{9r^{10/3}s^{7/2}}{r^{14/3}s^{10}} = \frac{9 \cdot \sqrt[3]{r^{10}} \cdot \sqrt{s^7}}{\sqrt[3]{r^{14}} \cdot \sqrt{s^{10}}} = \boxed{19r^3s^3 \cdot \sqrt[3]{r} \cdot \sqrt{s}}$$

$$7) \sqrt[7]{S^4(7-128S-4^7\sqrt{S^{10}})} = \sqrt[7]{-128S^5 - 4^7\sqrt{S^{14}}} = \boxed{-2 \cdot 7\sqrt{S^5} - 4S^2}$$

$$9) \sqrt[5]{uq(5\sqrt{u^2} + 2\sqrt{q^3})} = u^{1/5}q^{1/5}(u^{2/5} + 2u^{1/5}q^{3/5}) = u^{3/5}q^{1/5} + 2u^{2/5}q^{4/5} = \sqrt[5]{u^3q} + 2\sqrt[5]{u^2q^4} = \boxed{\sqrt[5]{u^3q} + 2\sqrt[5]{u^2q^4}}$$

$$11) \frac{3\sqrt[3]{81x^2y^{15}}}{3\sqrt[3]{3x^3y^2}} = \sqrt[3]{27x^{18}y^{13}} = \boxed{3x^6y^4\sqrt[3]{y}}$$