

Chapter 5 Review – Radical Expressions and Equations

Radical Expressions

1. Simplify by writing as a mixed radical.

(a) $\sqrt{32r^3}$

(b) $5\sqrt[3]{81x^6y^6}$

(c) $8\sqrt{72x^5y^{12}}$

(d) $\sqrt{75p^4}$

(e) $-3\sqrt[3]{24x^4y^3}$

(f) $-7\sqrt{50a^2b^2}$

2. Add or subtract.

(a) $-\sqrt{5} + 3\sqrt{12} - 2\sqrt{20}$

(b) $\sqrt[3]{108} - 3\sqrt[3]{4} - 3\sqrt[3]{32}$

(c) $-3\sqrt{6} - \sqrt{24} - 3\sqrt{5}$

(d) $\sqrt[3]{3} - 2\sqrt[3]{24} + 4\sqrt[3]{2} - 7\sqrt[3]{16}$

3. Multiply. Simplify your answers where possible.

(a) $-\sqrt{2p^3} \cdot \sqrt{20p}$

(b) $4\sqrt{2x^2} \cdot \sqrt{10x^3}$

$$(c) -4\sqrt{15}(\sqrt{6} + 2\sqrt{10})$$

$$(d) \sqrt{5n}(-2\sqrt{10} + 3n)$$

$$(e) (2 + \sqrt{5})(3 - \sqrt{5})$$

$$(f) (\sqrt{2r} - 4r)(2\sqrt{2r} + 3)$$

4. Divide. Rationalize the denominator when necessary and simplify your answer.

$$(a) \frac{4\sqrt{18}}{2\sqrt{6}}$$

$$(b) \frac{\sqrt{12}}{3\sqrt{16}}$$

$$(c) -\frac{3}{\sqrt{3}}$$

$$(d) \frac{\sqrt{2m^3n}}{\sqrt{10m^2n^2}}$$

$$(e) \frac{4\sqrt{8x^2}}{\sqrt{12x^4}}$$

$$(f) \frac{\sqrt{12a}}{\sqrt{20a^4}}$$

$$(g) \frac{\sqrt{3}}{4\sqrt{3}+\sqrt{2}}$$

$$(h) \frac{2p}{3-\sqrt{2p}}$$

Radical Equations

7. Solve each equation. Remember state the restrictions on the domain and to check for extraneous solutions!

$$(a) 9 + \sqrt{2k - 7} = 10 \quad \text{Rest:}$$

$$(b) 10 + \sqrt{20 - 2x} = x \quad \text{Rest:}$$

Check:

Check

$$(c) -2x + 2\sqrt{56 - 2x} = -8$$

Rest:

$$(d) 9 = 6 + \sqrt{n - 9}$$

Rest:

Check:

Check:

$$(e) \sqrt{2x - 1} = \sqrt{2x + 15} - 2$$

(Give it a try)

Rest:

Solutions:

Answers:

1a. $4r\sqrt{2r}$ 1b. $15x^2y^2\sqrt[3]{3}$ 1c. $48x^2y^6\sqrt{2x}$ 1d. $5p^2\sqrt{3}$ 1e. $-6xy\sqrt[3]{3x}$

1f. $-35ab\sqrt{2}$ 2a. $6\sqrt{3} - 5\sqrt{5}$ 2b. $-6\sqrt[3]{4}$ 2c. $-5\sqrt{6} - 3\sqrt{5}$

2d. $-3\sqrt[3]{3} - 10\sqrt[3]{2}$ 3a. $-2p^2\sqrt{10}$ 3b. $8x^2\sqrt{5x}$ 3c. $-12\sqrt{10} - 40\sqrt{6}$

3d. $3n\sqrt{5n} - 10\sqrt{2n}$ 3e. $1 + \sqrt{5}$ 3f. $(3 - 8r)\sqrt{2r} - 8r$ or $3\sqrt{2r} - 8r\sqrt{2r} - 8r$

4a. $2\sqrt{3}$ 4b. $\frac{\sqrt{3}}{6}$ 4c. $-\sqrt{3}$ 4d. $\frac{\sqrt{5mn}}{5n}$ 4e. $\frac{4\sqrt{6}}{3x}$ 4f. $\frac{\sqrt{15a}}{5a^2}$ 4g. $\frac{12-\sqrt{6}}{46}$ 4h. $\frac{6p+2p\sqrt{2p}}{9-2p}$

7a. $k=4$ 7b. $x=10$ 7c. $x=10$

7d. $n=18$ 7e. $x=5$