Unit 1 Review - Algebraic Skills

Radicals

1. Simplify by expressing each radical as a mixed radical.

   a) $\sqrt{54}$ b) $\sqrt{363}$

2. Multiply and simplify.

   a) $\sqrt{5} \bullet \sqrt{10}$ b) $-2\sqrt{15} \bullet 3\sqrt{10}$ c) $\sqrt{15} \bullet 3\sqrt{6} \bullet 2\sqrt{2}$

3. Add/subtract and simplify.

   a) $7\sqrt{3} - 9\sqrt{3} + 15\sqrt{3}$ b) $\sqrt{18} - \sqrt{8}$ c) $4\sqrt{18} - 2\sqrt{63} + \sqrt{175} + 5\sqrt{98}$

4. Expand and simplify.

   a) $\sqrt{2}(\sqrt{6} - \sqrt{3})$ b) $(3\sqrt{5} - 2\sqrt{3})(3\sqrt{5} + 2\sqrt{3})$

5. Simplify and rationalize the denominator (no radical sign in the denominator).

   a) $\frac{\sqrt{10}}{\sqrt{2}}$ b) $\frac{10\sqrt{3}}{2\sqrt{5}}$ c) $\frac{2}{3-\sqrt{2}}$ d) $\frac{4}{\sqrt{2}+3\sqrt{3}}$

Solving Equations

6. Solve.

   a) $x^2 + 7x + 10 = 0$ b) $2a^2 - 3a = 5$ c) $4z^2 - 25 = 0$

   d) $x^3 = -8x^2$

7. Solve the following radical equations.

   a) $2\sqrt{x} = 8$ b) $\sqrt{3x-1} + 7 = 10$ c) $\sqrt{x-2} - x = -8$

   d) $\sqrt{3x+4} + x = 12$

8. When will there be NO SOLUTION for radical equations?

9. Which of the following equations has extraneous roots (NO SOLUTION)?

   a) $\sqrt{x} = -5$ b) $-6\sqrt{x} = -10$ c) $\sqrt{3x-2} = -10$

Rational Expressions

10. Simplify and state restrictions.

a) $\frac{2m-4}{m^2-2m}$ b) $\frac{a+5}{-a-5}$ c) $\frac{t^2-7t+12}{t^3-6t^2+9t}$ d) $\frac{8k-20}{16k^2-100}$

11. Multiply/divide and simplify, and state restrictions.

a) $\frac{x^2-3x-10}{x+7} \bullet \frac{3x+21}{6x-30}$ b) $\frac{12x+48}{6x-15} \bullet \frac{4x^2-25}{x^2+9x+20}$ c) $\frac{k^2}{k^2-7k} \div \frac{1}{k^2-4k-21}$

12. Add/subtract and simplify, and state restrictions.

$$\frac{1}{2x+8} - \frac{3x}{x^2+8x+16} + \frac{1}{2}$$

Answers

1. a) $3\sqrt{6}$ b) $11\sqrt{3}$

2. a) $5\sqrt{2}$ b) $-30\sqrt{6}$ c) $36\sqrt{5}$

3. a) $13\sqrt{3}$ b) $\sqrt{2}$ c) $47\sqrt{2}-\sqrt{7}$

4. a) $2\sqrt{3}-\sqrt{6}$ b) 33

5. a) $\sqrt{5}$ b) $\sqrt{15}$ c) $\frac{6+2\sqrt{2}}{7}$ d) $\frac{-4\sqrt{2}+12\sqrt{3}}{25}$

6. a) x = -5, x = -2 b) a = $\frac{5}{2}$, a = -1 c) z = $\frac{5}{2}$, z = $\frac{-5}{2}$ d) x = 0, x = -8

7. a) 16 b) $\frac{10}{3}$ c) 11 d) 7

8. When the isolated radical equals a negative value.

9. a, c

10. a) $\frac{2}{m}, m \neq 0,2$ b) -1, $a \neq -5$ c) $\frac{t-4}{t(t-3)}, t \neq 0,3$ d) $\frac{1}{2k+5}, k \neq \frac{-5}{2}, \frac{5}{2}$

11. a) $\frac{x+2}{2}, x \neq -7,5$ b) $\frac{4(2x-5)}{x+5}, x \neq -5,-4,\frac{5}{2}$ c) $k^2+3k, k \neq -3,0,7$

12. $\frac{x^2+3x+20}{2(x+4)^2}, x \neq -4$