

**Algebra Review Notes**

Name: \_\_\_\_\_

**Simplifying Radical Expressions**

Date: \_\_\_\_\_ Pd: \_\_\_\_\_

There are two properties we can use to rewrite radical expressions.

- A. The square root of a product equals the product of the square roots of its factors.

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b} \quad \text{Product Property of Radicals}$$

- B. The square root of a quotient equals the quotient of the square roots of its numerator and denominator.

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}} \quad \text{Quotient Property of Radicals}$$

These properties can be used to write radical expressions in ***simplest radical form***. An expression with radicals is in ***simplest radical form*** if the following are true.

1. No radicands (expressions under radical signs) have perfect square factors other than 1.

$$\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4} \cdot \sqrt{2} = 2\sqrt{2}$$

2. No radicands contain fractions.

$$\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$$

3. No radicals appear in the denominator of a fraction.

$$\frac{5}{\sqrt{6}} = \frac{5}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{5\sqrt{6}}{\sqrt{36}} = \frac{5\sqrt{6}}{6}$$

Simplify each radical expression. Show all steps and circle your answer.

1.  $\sqrt{75}$

2.  $\sqrt{27}$

3.  $\sqrt{180}$

4.  $-\sqrt{200}$

5.  $\sqrt{\frac{49}{121}}$

6.  $\sqrt{\frac{12}{81}}$

7.  $\frac{3}{\sqrt{12}}$

8.  $\frac{8}{\sqrt{18}}$

9.  $\sqrt{\frac{1}{8}}$

10.  $\sqrt{\frac{3}{5}}$

Perform the indicated operations. Write your answers in SRF.

11.  $\frac{1}{3}\sqrt{63}$

12.  $3\sqrt[3]{\frac{5}{6}}$

13.  $\sqrt{10}\cdot\sqrt{20}$

14.  $\sqrt{2}\cdot\sqrt{3}\cdot\sqrt{6}$

15.  $(7\sqrt{3})^2$

16.  $\left(\frac{2}{3}\sqrt{3}\right)^2$

17.  $\frac{2\sqrt{5}}{\sqrt{4}}$

18.  $\frac{6}{\sqrt{3}}$

$$19. \quad 3 \pm \sqrt{40}$$

$$20. \quad \frac{-4 \pm \sqrt{32}}{2}$$

$$21. \quad \frac{-15 \pm \sqrt{50}}{10}$$

$$22. \quad \frac{-2 \pm \sqrt{(2)^2 - 4(6)(-1)}}{8}$$