

Math 95 HW 19 (7.4) Operations on Radical Expressions

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

**Concepts and Vocabulary:**

1.  $\sqrt{a} + \sqrt{a} =$  \_\_\_\_\_

2.  $\sqrt[3]{b} + \sqrt[3]{b} + \sqrt[3]{b} =$  \_\_\_\_\_

3. You cannot simplify  $\sqrt[3]{4} + \sqrt[3]{7}$  because they are not \_\_\_\_\_ radicals.

4. Can you simplify  $4\sqrt{15} - 3\sqrt{15}$ ? Explain.

6. To rationalize the denominator of  $\frac{2}{\sqrt{7}}$ , multiply this expression by \_\_\_\_\_.

7. What is the conjugate of  $\sqrt{t} - 5$ ?

8. To rationalize the denominator of  $\frac{1}{5 - \sqrt{2}}$ , multiply this expression by \_\_\_\_\_.

**Addition and Subtraction of Radicals:**

19.  $2\sqrt{3} + 7\sqrt{3}$

21.  $4\sqrt[3]{5} + 2\sqrt[3]{5}$

$$23. 7 + 4\sqrt{7}$$

$$37. \sqrt[3]{z} + \sqrt[3]{z}$$

$$25. 2\sqrt{3} + 3\sqrt{2}$$

$$39. 2\sqrt[3]{6} - 7\sqrt[3]{6}$$

$$27. \sqrt{3} + \sqrt[3]{3}$$

$$41. \sqrt[3]{y^6} - \sqrt[3]{y^3}$$

$$29. \sqrt[3]{16} + 3\sqrt[3]{2}$$

$$45. \sqrt[4]{48} + 4\sqrt[4]{3}$$

$$31. \sqrt{2} + \sqrt{18} + \sqrt{32}$$

$$47. \sqrt{9x} + \sqrt{16x}$$

49.  $3\sqrt{2k} + \sqrt{8k} + \sqrt{18k}$

71.  $2\sqrt[4]{64} - \sqrt[4]{324} + \sqrt[4]{4}$

63.  $\sqrt{25x^3} - \sqrt{x^3}$

77.  $\sqrt[4]{81a^5b^5} - \sqrt[4]{ab}$

65.  $\sqrt[3]{\frac{7x}{8}} - \frac{\sqrt[3]{7x}}{3}$

**Operations on Functions:**

In exercises 81 and 83, find  $(f + g)(x)$  and  $(f - g)(x)$ .

81.  $f(x) = 5\sqrt{x} - 2$  and  $g(x) = -2\sqrt{x} + 3$

83.  $f(x) = \sqrt[3]{8x} + 1$  and  $g(x) = 2\sqrt[3]{x} - 1$

### Multiplying Binomials Containing Radicals:

In exercises 85 - 93, multiply and simplify.

85.  $(\sqrt{x} - 3)(\sqrt{x} + 2)$

91.  $(\sqrt{x} + 8)(\sqrt{x} - 8)$

87.  $(3 + \sqrt{7})(3 - \sqrt{7})$

93.  $(\sqrt{ab} - \sqrt{c})(\sqrt{ab} + \sqrt{c})$

### Rationalizing the Denominator:

In exercises 97 - 121, rationalize the denominator.

97.  $\frac{1}{\sqrt{7}}$

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

99.  $\frac{4}{\sqrt{3}}$

103.  $\sqrt{\frac{b}{12}}$

107.  $\frac{1}{3 - \sqrt{2}}$

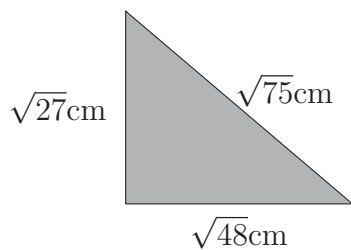
111.  $\frac{\sqrt{7} - 2}{\sqrt{7} + 2}$

109.  $\frac{\sqrt{2}}{\sqrt{5} + 2}$

115.  $\frac{\sqrt{z}}{\sqrt{z} - 3}$

**Geometry:**

125. Find the exact perimeter of the right triangle. Then approximate your answer.



129. A square has a diagonal that is 60 feet long. Find the exact perimeter of the rectangle and simplify your answer.