

# Mini Lab Activity: Simplifying Radical Expressions

MATH 1010

Name \_\_\_\_\_

Turn this sheet in to receive attendance credit for today.

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## First some "warm-ups":

Use rational exponents to simplify. Do not use rational exponents in the final answer. Assume that even roots are of nonnegative quantities.

1)

$$\sqrt[12]{x^8}$$

Divide and, if possible, simplify. Assume all variables represent positive real numbers.

2)

$$\frac{\sqrt[3]{80x^4y^2}}{\sqrt[3]{10x^2y}}$$

3) Why was it important to know that "All variables represent positive real numbers" in the previous problem? Discuss with your classmates.

Simplify. Assume that variables can represent **any** value.

4)  $\sqrt{16y^2}$

## Adding and Subtracting Rational Expressions

We can add and subtract "like" radicals - radicals of the same type. So just as  $5x + 7x = 12x$ ,  $5\sqrt{6} + 7\sqrt{6} = 12\sqrt{6}$ .

**Add or subtract. Simplify by combining like radical terms, if possible. Assume all variables and radicands represent nonnegative numbers.**

$$5) -8\sqrt{5} - 2\sqrt{5}$$

$$6) 15\sqrt[3]{3} + 11\sqrt[3]{3}$$

$$7) 9\sqrt{5} - 4\sqrt{10}$$

For some problems, you'll first have to simplify each of the terms, then look for like radical terms to combine.

**Add or subtract. Simplify by combining like radical terms, if possible. Assume all variables and radicands represent nonnegative numbers.**

$$8) \sqrt{6a} - 4\sqrt{54a} - 4\sqrt{216a}$$

$$9) 13\sqrt[3]{2} - 3\sqrt[3]{54}$$

10)

$$5\sqrt[9]{x^{10}y} - 4x\sqrt[9]{xy}$$

**Simplify. Try working with each term independently, then writing your final result as a single rational expression.**

$$11) 2\sqrt{\frac{32}{36}} + 2\frac{\sqrt{27}}{\sqrt{108}}$$

**Simplify. Assume all variables represent positive numbers.**

$$12) \sqrt{\frac{80}{y^4}} + \sqrt{\frac{81}{y^{10}}}$$

**Last, some review!**

Rationalize the denominator. Assume all variables represent positive numbers.

13)  $\sqrt{\frac{50}{x}}$

14)

$$\sqrt[3]{\frac{5}{9x^2}}$$

Factor the polynomial.

15)  $25z^4 + 10z^2 - 8$

Divide and simplify.

16)  $\frac{z^2 + 9z + 18}{z^2 + 10z + 24} \div \frac{z^2 + 3z}{z^2 - 5z - 36}$