Student_____

5.1 How radicals behave

Date: _____

Exploration 7

When adding and subtracting radicals, the same rules apply as when you are adding or subtracting whole numbers, fractions or variables.

1 Write down each of the following statements in mathematical notation, and then find the answer.

a Three twos plus four twos makes ☐ twos.

b Two sixths plus three sixths makes ☐ sixths.

c Five x's plus six x's makes ☐ x's.

d Three square roots of two plus five square roots of two makes ☐ square roots of two.

2 Write down each of the following expressions using mathematical notation and determine if they can be further simplified.

a) Three twos plus four fives

b) One third plus three quarters

c) Six x's plus five y's

d) Two square roots of two plus two square roots of three

3 Based on steps **1** and **2**, deduce a rule for adding and subtracting square roots.

4 Compare and contrast these four expressions. State in what ways are they similar and in what ways are they different.

$3x+8x$ $\qquad$ $3\times5+8\times5$

$\frac{3}{10}+\frac{8}{10}$ $\qquad$ $3\sqrt{2}+8\sqrt{2}$

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5 Simplify each of these four expressions.

$\sqrt{5}+\sqrt{5}$ $2\sqrt{5}$

$\sqrt{10}$ $\sqrt{20}$

a Without using a calculator, determine which of the expressions are equal.

b Use your calculator to verify your answer.

c Of the expressions that are equal, suggest which one is written in its simplest form.

6 Each of these expressions has been simplified.

$2\sqrt{5}+7\sqrt{5}=9\sqrt{5}$ $6\sqrt{3}-2\sqrt{3}=4\sqrt{3}$

$2\sqrt{7}-10\sqrt{7}=-8\sqrt{7}$ $7\sqrt{10}+3\sqrt{10}-4\sqrt{10}=6\sqrt{10}$

Deduce a rule for adding/subtracting radical expressions.