Section 5.2D

Choose values for ***a*** and ***b*** and use decimal approximations in your calculator to explore whether the following statements are ***true*** or ***false***. Repeat with at least one other set of values for ***a*** and ***b***. Justify your answer. Caution: finding some values for which the statement is true does not make the statement true. However, finding a single example where the statement is not true proves the entire statement false.

When completed, compare your results with other groups in class. Make a conjecture for each statement, based on this data.

	Equation Conjecture	First set of values: $a =$ 5 $b =$ 4	Second set of values: $a =$ 12 $b =$ 16	Equation Conjecture
1)	$\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$	$\sqrt{5 \cdot 4} = \sqrt{5} \cdot \sqrt{4}$ (circled) True False (circle one)	$\sqrt{12 \cdot 16} = \sqrt{12} \cdot \sqrt{16}$ (circled) True False (circle one)	$\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$ (circled) **True** **False**
2)	$\sqrt{a+b} = \sqrt{a} + \sqrt{b}$	$\sqrt{5+4} = \sqrt{5} + \sqrt{4}$ True (circled) False (circle one)	$\sqrt{12+16} = \sqrt{12} + \sqrt{16}$ True (circled) False (circle one)	$\sqrt{a+b} = \sqrt{a} + \sqrt{b}$ **True** (circled) **False**

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Choose values for ***a*** and ***b*** and use decimal approximations in your calculator to explore whether the following statements are ***true*** or ***false***. Repeat with at least one other set of values for ***a*** and ***b***. Justify your answer. Caution: finding some values for which the statement is true does not make the statement true. However, finding a single example where the statement is not true proves the entire statement false.

When completed, compare your results with other groups in class. Make a conjecture for each statement, based on this data.

	Equation Conjecture	First set of values: $a =$ 5 $b =$ 4	Second set of values: $a =$ 3 $b =$ 9	Equation Conjecture
3)	$\sqrt{a-b} = \sqrt{a} - \sqrt{b}$	True False (circle one)	True False (circle one)	$\sqrt{a-b} = \sqrt{a} - \sqrt{b}$ **True** **False**
4)	$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$	$\sqrt{\frac{5}{4}} = \frac{\sqrt{5}}{\sqrt{4}}$ True (circled) False (circle one)	$\sqrt{\frac{3}{9}} = \frac{\sqrt{3}}{\sqrt{9}}$ True (circled) False (circle one)	$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ **True** (circled) **False**

#1 – 6: Simplify the following. Show your work.

1) $\sqrt{20}$ $= \sqrt{4 \cdot 5}$
$= \sqrt{4} \cdot \sqrt{5}$
$= 2 \cdot \sqrt{5}$

2) $\sqrt{50}$
$= \sqrt{25 \cdot 2}$
$= \sqrt{25} \cdot \sqrt{2}$
$= 5 \cdot \sqrt{2}$

3) $\sqrt{18}$ $= \sqrt{9 \cdot 2}$
$3\sqrt{2}$

4) $\sqrt{75}$ $= \sqrt{25 \cdot 3}$
$5\sqrt{3}$

5) $\sqrt{48}$
$\sqrt{16 \cdot 3}$
$4\sqrt{3}$

6) $\sqrt{700}$
$\sqrt{100 \cdot 7}$
$10\sqrt{7}$

1
4
9
16
25
36
49
64
81
100

Products and quotients involving radicals: Things inside and outside of radicals cannot simply be multiplied or divided.

Example 5:	*Example 6:*
Simplify $3\sqrt{12}$	Simplify $\frac{\sqrt{32}}{2}$
Answer:	*Answer:*
$3\sqrt{12} = 3\sqrt{4 \cdot 3} = 3 \cdot 2\sqrt{3} = 6\sqrt{3}$	$\frac{\sqrt{32}}{2} = \frac{\sqrt{16 \cdot 2}}{2} = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$

#16 – 18: Simplify (some of these may already be simplified)

16) $4\sqrt{20}$ $= 4 \cdot \sqrt{20}$
$4 \cdot 2\sqrt{5}$
$8\sqrt{5}$

17) $\frac{\sqrt{72}}{9}$

18) $\frac{4+\sqrt{28}}{2}$

Simplify the expression:

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1. $4\sqrt{20}$

$8\sqrt{5}$

2. $\frac{\sqrt{45}}{6}$

$= \frac{\sqrt{9 \cdot 5}}{6}$

$= \frac{\sqrt{9} \cdot \sqrt{5}}{6}$

$= \frac{3 \cdot \sqrt{5}}{6}$

$= \frac{1\sqrt{5}}{2}$

3. $\frac{6+2\sqrt{8}}{2}$

$\frac{6+2 \cdot 2\sqrt{2}}{2}$

$\frac{6+4\sqrt{2}}{2}$

$\frac{6}{2} + \frac{4\sqrt{2}}{2}$

$3+2\sqrt{2}$

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

1
4
9
16
25
36
49
64
81
100

Simplify the expression:

4. $\frac{5+8\sqrt{20}}{10}$

5. $\frac{14+\sqrt{36}}{2}$

6. $\frac{14+7\sqrt{100}}{2}$

$\frac{14+6}{2}$

$= \frac{20}{2}$

$= 10$