Module 4b: Simplifying Radicals

Math Practice(s):

-Look for & express regularity in repeated reasoning.

Learning Target(s):

-Simplify & perform operations on radicals.

Homework:

HW#1: 4b #1-9

Aug 8-12:20 PM

Warm-up

1. Complete the table by squaring each number.

n	n^2
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81
10	100
11	121
12	144
13	169
14	196
15	225
20	400
25	625
30	900
40	1600
50	2500

2. In the table to the left, each number in the n^2 column is called a ***PERFECT SQUARE*** ***(#VOC):*** *a product that results from multiplying an integer by itself (i.e., the result when you "square" an integer).*

- 144 is a perfect square because it is a product of 12 and itself
- 16 is a perfect square because it is a product of 4 and itself

Fill in the blanks:

a. 81 is a perfect square because it is a product of 9 and itself.

b. 900 is a perfect square because it is a product of 30 and itself.

c. In general, n^2 is a perfect square because it is a product of n and itself.

Reflection:

d. Considering the statements above, explain why the number 54 is **not** a perfect square.

There is no number, multiplied by itself, that equals 54.

54 isn't a product of a number and itself.

e. State 3 other numbers that are **not** perfect squares.

19, 42, 94, 37, 200, 101, 150

3. Each of the following numbers has a factor that is a perfect square. Fill in the blanks to show that the given number has a ***perfect square*** factor.
   - Example: 20 is not a perfect square. However, one of its factors ***is*** a perfect square: 4. Therefore, $20 = 4 \cdot 5$

a. $90 = 9 \cdot 10$

b. $200 = 100 \cdot 2$ or $4 \cdot 50$ or $25 \cdot 8$

c. $75 = 25 \cdot 3$

d. $12 = 4 \cdot 3$

4. Re-write the following square roots as equivalent whole numbers.

a. $\sqrt{49} =$ 7 **c.** $\sqrt{25} =$ 5 **e.** $\sqrt{144} =$ 12

b. $\sqrt{81} =$ 9 **d.** $\sqrt{169} =$ 13 **f.** $\sqrt{100} =$ 10

5. Which of the following expressions are equivalent to $\sqrt{72}$?

Expression	Equivalent to $\sqrt{72}$? (Yes or No)
$4\sqrt{18}$	No
$2\sqrt{6}$	No
$6\sqrt{2}$	simplest radical form yes
$3\sqrt{8}$	yes
$12\sqrt{6}$	No

4 · 18

9 · 8

36 · 2

$\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$

$\sqrt{72}$

$\sqrt{36 \cdot 2}$

$\sqrt{36} \cdot \sqrt{2}$

$6 \cdot \sqrt{2}$

$6\sqrt{2}$

$4\sqrt{18}$

$4 \cdot \sqrt{18}$

$\sqrt{16} \cdot \sqrt{18}$

$\sqrt{16 \cdot 18}$

$\sqrt{288}$

$\sqrt{72}$

$\sqrt{9 \cdot 8}$

$\sqrt{9} \cdot \sqrt{8}$

$3 \cdot \sqrt{8}$

$3\sqrt{8}$

$3\sqrt{4 \cdot 2}$

$3 \cdot \sqrt{4} \cdot \sqrt{2}$

$3 \cdot 2 \cdot \sqrt{2}$

$6\sqrt{2}$

$2\sqrt{6}$

$\sqrt{4} \cdot \sqrt{6}$

$\sqrt{4 \cdot 6}$

$\sqrt{24}$

$12\sqrt{6}$

$\sqrt{144} \cdot \sqrt{6}$

$\sqrt{144 \cdot 6}$

$\sqrt{864}$

Oct 19-7:18 AM

6. For each pair of numbers, indicate which one has a larger value. Do NOT use a calculator. Show your reasoning.

a. 7 or $5\sqrt{2}$

$\sqrt{49}$ $\sqrt{25}\cdot\sqrt{2}$

$\sqrt{50}$

b. 10 or $3\sqrt{11}$

$\sqrt{100}$ $\sqrt{99}$

c. $3\sqrt{3}$ or $2\sqrt{7}$

$\sqrt{9}\cdot\sqrt{3}$ $\sqrt{4}\cdot\sqrt{7}$

$\sqrt{27}$ $\sqrt{28}$

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

7 $2^2\cdot\sqrt{3}^2$

$4\cdot 3$

12

e. 15^2 or $(10^2 + 5^2)$

225 $(100+25)$

125

f. $\sqrt{17}$ or $(\sqrt{5})^2$

$\sqrt{17}$ $\sqrt{25}$

7. Solve each equation. Express your answer as a radical with no perfect square factors AND as a decimal (rounded to the thousandths place).

a. $x^2 = 40$

$\sqrt{x^2} = \sqrt{40}$

$\sqrt{4\cdot 10}$

$\sqrt{4}\cdot\sqrt{10}$

$x = \pm 2\sqrt{10}$

$x \approx \pm 6.325$

OR

$x = 2\sqrt{10}$ & $-2\sqrt{10}$

$x \approx 6.325$ & -6.325

b. $x^2 + 100 = 400$

$-100 \quad -100$

$\sqrt{x^2} = \sqrt{300}$

$\sqrt{100}\cdot\sqrt{3}$

$x = \pm 10\sqrt{3}$

$x \approx \pm 17.321$

$\sqrt{300}$

$\sqrt{25}\cdot\sqrt{12}$

$5\sqrt{12}$

$5\sqrt{4}\cdot\sqrt{3}$

$5\cdot 2\cdot\sqrt{3}$

$10\sqrt{3}$

c. $5x^2 - 65 = 0$

$+65 \quad +65$

$\frac{5x^2}{5} = \frac{65}{5}$

$\sqrt{x^2} = \sqrt{13}$

$x = \pm\sqrt{13}$

$x \approx \pm 3.606$