Notes:

[11.4] Irrational Square Roots (Simplifying Radicals)

① $\sqrt{500} = \sqrt{100 \cdot 5} = 10\sqrt{5}$ (10 over 100)

What is the biggest Perfect Square Factor?

② $\sqrt{63} = \sqrt{9 \cdot 7} = 3\sqrt{7}$ (3 over 9)

③ $5\sqrt{8} = 5\sqrt{4 \cdot 2} = 10\sqrt{2}$ (2 over 4)

④ $\sqrt{72} = \sqrt{9 \cdot 8} = \sqrt{9 \cdot 4 \cdot 2} = 6\sqrt{2}$ (3 over 9, 2 over 4)

or $= \sqrt{36 \cdot 2} = 6\sqrt{2}$ (6 over 36) ← Same

⑤ $7\sqrt{12} = 7\sqrt{4 \cdot 3} = 14\sqrt{3}$ (2 over 4)

⑥ $\sqrt{2800} = \sqrt{100 \cdot 4 \cdot 7} = 20\sqrt{7}$ (10 over 100, 2 over 4)

⑦ $\sqrt{960} = \sqrt{4 \cdot 240} = \sqrt{4 \cdot 4 \cdot 60} = \sqrt{4 \cdot 4 \cdot 4 \cdot 15} = 8\sqrt{15}$ (2, 2, 2 over 4, 4, 4)

$\sqrt{64 \cdot 15} = 8\sqrt{15}$ (8 over 64)

Look For... IF

(4) Last 2 digits are divisible by 4

(9) If the sum of the digits is divisible by 9

(25) If the last 2 digits are 00, 25, 50, 75 (100 these)

⑧ $\sqrt{50} = \sqrt{25 \cdot 2}$ $5\sqrt{2}$

⑨ $\sqrt{98} = \sqrt{49 \cdot 2}$ $7\sqrt{2}$

⑩ $\sqrt{350} = \sqrt{25 \cdot 14}$ $5\sqrt{14}$

⑪ $\sqrt{128} = \sqrt{64 \cdot 2}$ $8\sqrt{2}$

Homework:

NAME _____ DATE _____

Irrational Square Roots

Objective: To simplify radicals and to find decimal approximations of irrational square roots.

Vocabulary

Irrational numbers Real numbers that can't be expressed in the form $\frac{a}{b}$, where a and b are integers. Their exact values can't be expressed as either terminating or repeating decimals.

Property

Property of Completeness Every decimal represents a real number, and every real number can be represented by a decimal.

Example 1 Simplify: **a.** $\sqrt{256}$ **b.** $\sqrt{50}$ **c.** $2\sqrt{80}$ **d.** $\sqrt{704}$

Solution

a. $\sqrt{256} = \sqrt{4 \cdot 64}$ Factor within the radical sign.
$= \sqrt{4} \cdot \sqrt{64}$ Use the product property of square roots.
$= 2 \cdot 8$ Simplify.
$= 16$

b. $\sqrt{50} = \sqrt{25 \cdot 2}$
$= \sqrt{25} \cdot \sqrt{2}$
$= 5\sqrt{2}$

c. $2\sqrt{80} = 2\sqrt{16 \cdot 5}$
$= 2 \cdot 4\sqrt{5}$
$= 8\sqrt{5}$

d. $\sqrt{704} = \sqrt{64 \cdot 11}$
$= 8\sqrt{11}$

Simplify.

1. $\sqrt{27}$	**2.** $\sqrt{20}$	**3.** $\sqrt{72}$	**4.** $\sqrt{32}$	**5.** $\sqrt{48}$
6. $\sqrt{45}$	**7.** $\sqrt{196}$	**8.** $\sqrt{80}$	**9.** $2\sqrt{63}$	**10.** $4\sqrt{98}$
11. $7\sqrt{28}$	**12.** $4\sqrt{40}$	**13.** $\sqrt{441}$	**14.** $\sqrt{289}$	**15.** $3\sqrt{50}$
16. $12\sqrt{50}$	**17.** $\sqrt{729}$	**18.** $\sqrt{432}$	**19.** $8\sqrt{75}$	**20.** $2\sqrt{90}$
21. $\sqrt{147}$	**22.** $\sqrt{288}$	**23.** $\sqrt{4225}$	**24.** $5\sqrt{800}$	**25.** $5\sqrt{1025}$