Radicals and Rewriting Expressions

Name

Targets: Students can simplify exponents *Students can rewrite expressions to different powers*

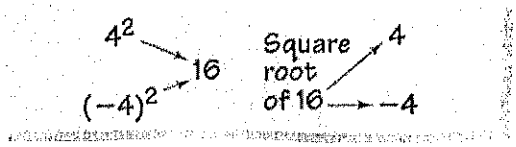
WARM-UP: *List the perfect squares under the following numbers.*

1^2 2^2 3^2 4^2 5^2 6^2 7^2 8^2 9^2 10^2 11^2 12^2 13^2 14^2 15^2

$= 1$ $= 4$ 9 16 25 36 49 64 81 100 121 144 169 196

$\sqrt{\ }$: indicates a square root **Radicand**: is the expression under the_____

** Squaring and square roots are **inverse operations**



Simplify each expression.

Example: $\sqrt{64}$

$= \sqrt{8 \cdot 8}$

$= \sqrt{8^2}$

$= 8$

1) $\sqrt{1000}$

$= \sqrt{10 \cdot 10 \cdot 10}$

$= 10\sqrt{10}$

2) $\sqrt{32}$

$= \sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$

$= 4\sqrt{2}$

3) $\sqrt{15}$

$= \sqrt{5 \cdot 3}$

$\sqrt{15}$

4) $\sqrt{16}$

$= \sqrt{4 \cdot 4}$

$= 4$

Example: $\sqrt{50}$

$= \sqrt{2(5 \cdot 5)}$

$= 5\sqrt{2}$

1) $\sqrt{80}$

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

$= 4\sqrt{5}$

2) $\sqrt{60}$

$= \sqrt{(2)3(2)5}$

$= 2\sqrt{15}$

3) $\sqrt{300}$

$= \sqrt{10 \cdot 10 \cdot 3}$

$= 10\sqrt{3}$

4) $\sqrt{75}$

$= \sqrt{(5 \cdot 5)3}$

$= 5\sqrt{3}$

Rewrite each expression with the indicated power

Example: Rewrite 16 as a power of 2 $= 2 \cdot 2 \cdot 2 \cdot 2 = 2^4$

1) Rewrite 4 as a power of 2: $= 2 \cdot 2 = 2^2$

2) Rewrite 8 as a power of 2: $= 2 \cdot 2 \cdot 2 = 2^3$

3) Rewrite 32 as a power of 2: $= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2^5$

4) Rewrite 125 as a power of 5 $= 5 \cdot 5 \cdot 5 = 5^3$

WORKSHOP:

Simplify each radical expression.

1) $\sqrt{200}$

$= \sqrt{2 \cdot 10 \cdot 10}$

$= 10\sqrt{2}$

2) $\sqrt{84}$

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

$= 2\sqrt{21}$

3) $\sqrt{48}$

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

$= 4\sqrt{3}$

4) $\sqrt{250}$

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

$= 5\sqrt{10}$

9) $\sqrt{20}$

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

$= 2\sqrt{5}$

10) $\sqrt{36}$

$= \sqrt{6 \cdot 6}$

6

11) $\sqrt{136}$

$= \sqrt{2 \cdot 2 \cdot 2 \cdot 17}$

$= 2\sqrt{34}$

12) $\sqrt{1}$

$= \sqrt{1 \cdot 1}$

$= 1$

Rewrite each expression with the indicated power.

1) Rewrite 27 as a power of 3: $= 3 \cdot 3 \cdot 3 = 3^3$

2) Rewrite 64 as a power of 4: $= 4 \cdot 4 \cdot 4 = 4^3$

3) Rewrite 64 as a power of 2: $= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2^6$

4) Rewrite 81 as a power of 9 $= 9 \cdot 9 = 9^2$

5) Rewrite 81 as a power of 3 $= 3 \cdot 3 \cdot 3 \cdot 3 = 3^4$