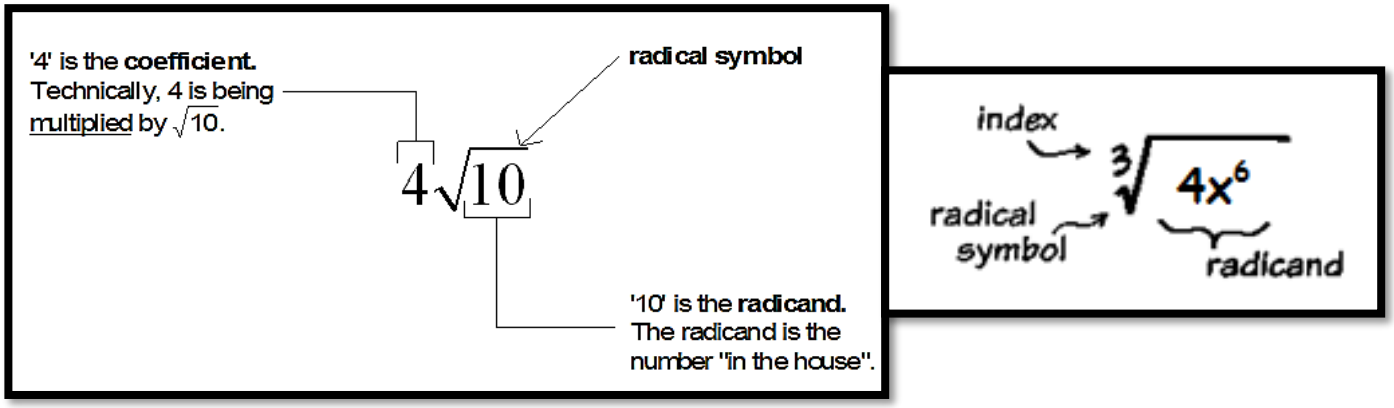
Simplifying Radicals

Perfect Squares	1	4	9	16	25	36	49	64	81	100	121	144
	$\sqrt{1}$	$\sqrt{4}$	$\sqrt{9}$	$\sqrt{16}$	$\sqrt{25}$	$\sqrt{36}$	$\sqrt{49}$	$\sqrt{64}$	$\sqrt{81}$	$\sqrt{100}$	$\sqrt{121}$	$\sqrt{144}$
Square Root	1	2	3	4	5	6	7	8	9	10	11	12

A **radical** is any number with a radical symbol ($\sqrt{\ }$).

A **radical expression** is an expression (coefficients and/or variables) with radical.



When are Radical Expressions in Simplest Form?

A _____ expression is in **simplest form** if:

- No perfect square factors other than 1 are in the radicand
  Example: $\sqrt{11}$

- What if there is a perfect square factor in the radicand? According to the Product Properties of Radicals, we can split the radical into the product of two radicals. Then we can evaluate the square root of the perfect square factor. It becomes the coefficient of the radical.
  Example: $\sqrt{20}$

Simplifying Radicals

Guided Example: Simplify $\sqrt{108}$.

Step 1: Begin by finding perfect square factors of the radicand.	
Step 2: Split the radical into the product of two radicals. *Look for the biggest perfect square factor of the radicand*	
Step 3: Evaluate the square root of the perfect square factor, and place it in the front of the radical as a coefficient. Leave the remaining factor inside the radical.	
Step 4: Repeat steps 1-4 until radical cannot be simplified further.	

Practice:

a. $\sqrt{32}$ b. $\sqrt{48}$ c. $\sqrt{28}$

d. $\sqrt{14}$ e. $3\sqrt{96}$ f. $4\sqrt{20}$

g. $6\sqrt{120}$ h. $2\sqrt{36}$ i. $\sqrt{24}$

Perfect Square	1	4	9	16	25	36	49	64	81	100	121	144	169
$\sqrt{\ }$	1	2	3	4	5	6	7	8	9	10	11	12	13

Simplify each radical expression, if possible. Find the correct answer below.
Write the letters in the boxes below to answer the riddle.

1) $\sqrt{100}$	2) $\sqrt{24}$	3) $\sqrt{18}$	4) $\sqrt{4}$
5) $\sqrt{7}$	6) $\sqrt{98}$	7) $\sqrt{16}$	8) $\sqrt{8}$
9) $\sqrt{20}$	10) $\sqrt{63}$	11) $\sqrt{32}$	12) $\sqrt{12}$
13) $\sqrt{121}$	14) $\sqrt{45}$	15) $\sqrt{48}$	16) $\sqrt{10}$
17) $\sqrt{50}$	18) $\sqrt{72}$	19) $\sqrt{300}$	20) $\sqrt{75}$

Answer Choices:

$3\sqrt{10}$	$7\sqrt{2}$	$2\sqrt{6}$	$\sqrt{4}$	9	$3\sqrt{7}$	$5\sqrt{3}$	$4\sqrt{3}$	$4\sqrt{6}$	$2\sqrt{5}$
?	A	A	!	R	E	!	S	S	V
2	$\sqrt{7}$	$2\sqrt{7}$	$\sqrt{3}$	10	$16\sqrt{2}$	$2\sqrt{2}$	6	12	$9\sqrt{8}$
W	H	O	T	E	J	E	V	R	O
$3\sqrt{5}$	$3\sqrt{2}$	$8\sqrt{3}$	$4\sqrt{2}$	$9\sqrt{2}$	3	$\sqrt{12}$	$6\sqrt{2}$	1	$\sqrt{10}$
G	T	E	R	Q	U	W	E	C	T
7	25	11	$8\sqrt{2}$	$24\sqrt{2}$	$2\sqrt{3}$	$5\sqrt{2}$	8	$10\sqrt{3}$	4
P	R	U	W	H	B	H	A	M	T

Why are frogs so happy?

THEY																			