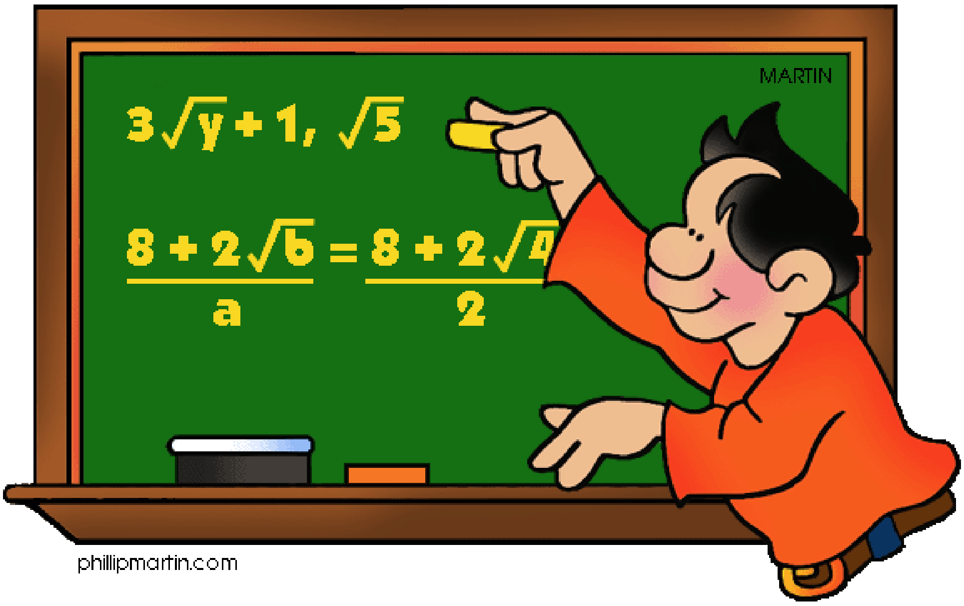
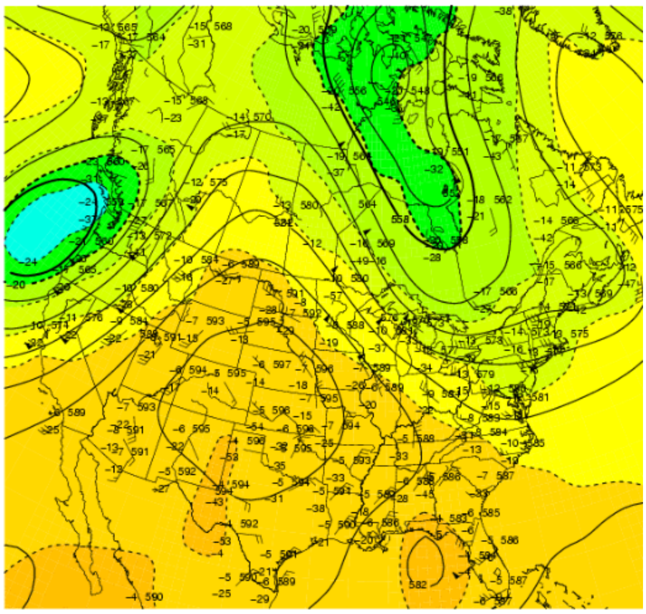
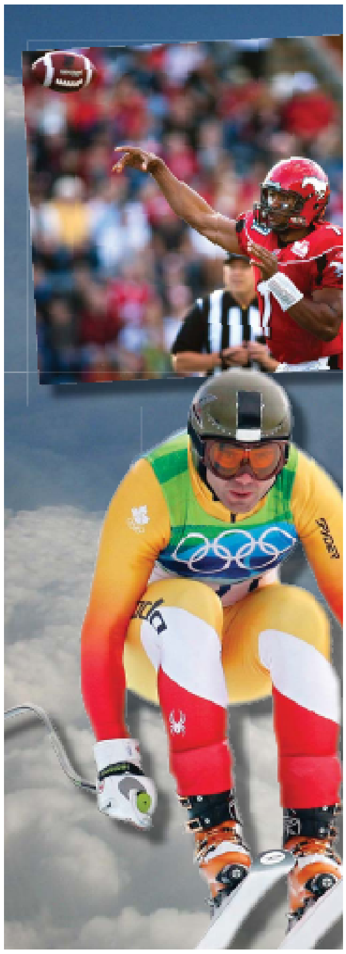
Intro Review of Radicals

Radical Expressions & Equations



Radical equations can be used to model a variety of relationships - from tracking storms to modeling the path of a football or skier through the air.





WHAT DO WE KNOW?

$$\sqrt[3]{54}$$

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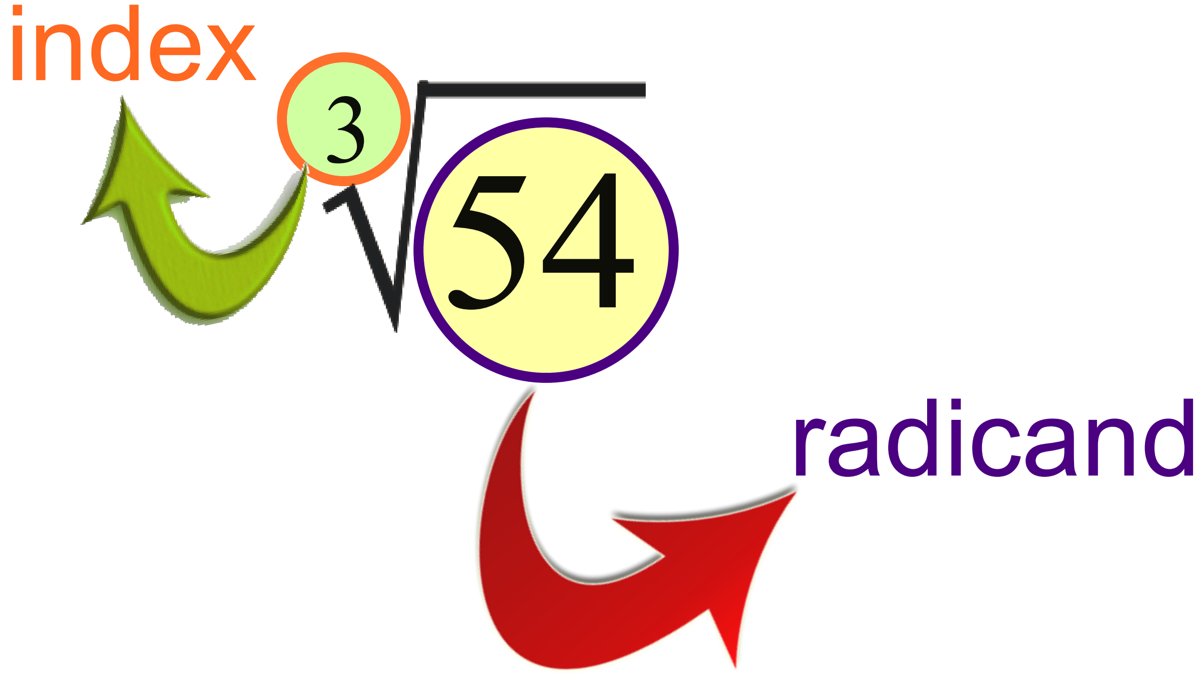

WHAT DO WE KNOW?

- We know that radicals generally look like:

$\sqrt{16}$ $\sqrt[3]{27}$ $3\sqrt{5}$ $2\sqrt[3]{3}$

- We know that radicals can be expressed in three forms:

1. Entire - $\sqrt{12}$
2. Equivalent - $\sqrt{4}$ x $\sqrt{3}$
3. Mixed - $2\sqrt{3}$

- We know how to change from entire to mixed and vice versa...

1. $7\sqrt{2}$

2. $\sqrt{200}$

3. $\sqrt{48}$

4. $3\sqrt{5}$

In this unit, we will:

- compare and order radicals
- add, subtract, multiply, and divide radicals
- solve both equality and inequality problems that involve radicals
- determine the roots of a radical
- identify restrictions on values for the variable in radical equations

LET'S BEGIN...

Ex. 1: Convert from mixed to entire form

a) $a^4\sqrt{a}$

b) $5b\sqrt[3]{3b^2}$

c) $j^3\sqrt{j}$

d) $2k^2(\sqrt[3]{4}k)$

Ex. 2: Convert from entire to mixed form.

a) $\sqrt[4]{c^9}$ b) $\sqrt{48y^5}$

c) $\sqrt[4]{m^7}$ d) $\sqrt{63n^7p^4}$

Ex. 3: Compare and order the following.

$4(13)^{1/2}$ $\quad 8\sqrt{3}$ $\quad 14$ $\quad \sqrt{202}$ $\quad 10\sqrt{2}$

<u>Ex. 4:</u> Lets's add and subtract.

Radicals with the same radicand and index are called 'like radicals'.

When adding or subtracting radicals, only 'like radicals' can be combined. You may need to convert radicals to a different form before identifying like radicals.

a) $\sqrt{50} + 3\sqrt{2}$

b) $-\sqrt{27} + 3\sqrt{5} - \sqrt{80} - 2\sqrt{12}$

Intro Review of Radicals

Key Ideas

- You can compare and order radicals using a variety of strategies:
  - Convert unlike radicals to entire radicals. If the radicals have the same index, the radicands can be compared.
  - Compare the coefficients of like radicals.
  - Compare the indices of radicals with equal radicands.
- When adding or subtracting radicals, combine coefficients of like radicals. In general, $m\sqrt[r]{a} + n\sqrt[r]{a} = (m + n)\sqrt[r]{a}$, where r is a natural number, and m, n, and a are real numbers. If r is even, then $a \geq 0$.
- A radical is in simplest form if the radicand does not contain a fraction or any factor which may be removed, and the radical is not part of the denominator of a fraction.

  For example,
  $$\begin{aligned} 5\sqrt{40} &= 5\sqrt{4(10)} \\ &= 5\sqrt{4}(\sqrt{10}) \\ &= 5(2)\sqrt{10} \\ &= 10\sqrt{10} \end{aligned}$$
- When a radicand contains variables, identify the values of the variables that make the radical a real number by considering the index and the radicand:
  - If the index is an even number, the radicand must be non-negative.

    For example, in $\sqrt{3n}$, the index is even. So, the radicand must be non-negative.

    $3n \geq 0$

    $n \geq 0$
  - If the index is an odd number, the radicand may be any real number.

    For example, in $\sqrt[3]{x}$, the index is odd. So, the radicand, x, can be any real number—positive, negative, or zero.

Assignment:

PC11 Text Page 278 # 1-6, 8, 9, 10(a,b),15,20