Chapter 9 :
Trigonometry
"Rad"icals

2/19

Jan 23-7:46 AM

What does square root mean?

$\sqrt{a}$ radical symbol, radicand

index
$\sqrt[2]{4} = \boxed{2}$

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

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$\sqrt{a \bullet b} = \sqrt{a} \bullet \sqrt{b}$ Product Property *of radicals*

Simplest form: 1.) NO PERFECT SQUARES LEFT IN RADICALS
2.) NO SQUARE ROOTS IN DENOMINATOR

Feb 12-8:11 AM

Simplifying Radicals:

$\sqrt{18} = \sqrt{9}\cdot\sqrt{2} = \boxed{3\sqrt{2}}$

9 2

Perfect Square

Why not choose 6 and 3 as multiples of 18?
not perfect squares

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Example 1
Simplify.
a. $\sqrt{75}$

$\sqrt{25}\sqrt{3}$

$\boxed{5\sqrt{3}}$

factor of 75 that is a perfect square

TOYO:
$\sqrt{500} = \sqrt{100}\ \sqrt{5}$

$\boxed{10\sqrt{5}}$

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Example 2
Simplify.

You can multiply numbers on the OUTSIDE together or on the INSIDE together BUT NEVER INSIDE AND OUT together!!!!!

a. $2\sqrt{96}$

$2\sqrt{16\cdot 6}$

$2\cdot 4\sqrt{6}$

$\boxed{8\sqrt{6}}$

factor of 96 thats a perfect square.

b. $\frac{1}{3}\sqrt{90}$

factor of 90 thats a perfect square root

$\frac{1}{3}\cdot\sqrt{9}\sqrt{10}$

$\frac{1}{3}\cdot 3\cdot\sqrt{10}$

$\boxed{1\sqrt{10}}$

Jan 26-9:47 AM

Example 3

Simplify.

a. $\sqrt{48} \bullet 2\sqrt{6}$

TOYO:

b. $2\sqrt{3} \bullet 4\sqrt{27}$

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NOBODY EVER TOLD YOU.....but $\sqrt[2]{16}$

Ex 4

Simplify.

a. $\left(4\sqrt{13}\right)^2 = \left(4 \cdot \sqrt{13}\right)^2$

b. $\left(5\sqrt{11}\right)^2$

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Radicals in the denominator must be rationalized

$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ *division property of radicals*

Example 5

Simplify.

a. $\sqrt{\frac{16}{9}}$

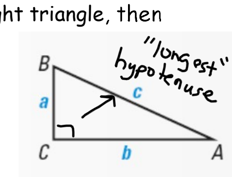
b. $\frac{\sqrt{24}}{\sqrt{6}}$

Mar 4-7:11 PM

The Pythagorean Theorem

If triangle ABC is a right triangle, then $c^2 = a^2 + b^2$.

$a^2 + b^2 = c^2$



Uppercase Angles

Lowercase Sides

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Pythagorean Triples: a set of three positive integers a, b, and c that satisfy the equation $c^2 = a^2 + b^2$

Proving Side lengths form a right triangle

(no decimals)

ex 1: 6, 8, 10 "c"

$6^2 + 8^2 \; \square \; 10^2$

$36 + 64 = 100$ yes rt. triangle

ex 2: 5, 12, 13 "c"

$5^2 + 12^2 \; \square \; 13^2$

$25 + 144 = 169$ ✓ yes

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IF its not a right triangle

If $c^2 < a^2 + b^2$, then the triangle is acute.

$a^2 + b^2 > c^2$

If $c^2 > a^2 + b^2$, then the triangle is obtuse.

$a^2 + b^2 < c^2$

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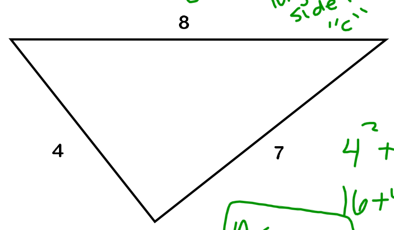
What type of triangle is it
ACUTE, OBTUSE, RIGHT?!

ex1

"c" assume longest side is "c"



$4^2+7^2 \square 8^2$

$16+49 \square 64$

$65 > 64$

$\boxed{\text{Acute}}$

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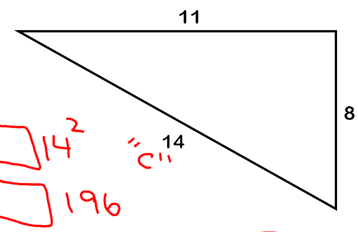
What type of triangle is it
ACUTE, OBTUSE, RIGHT?!

ex2



"c"

$11^2+8^2 \square 14^2$

$121+64 \square 196$

$185 < 196$

$\boxed{\text{OBTUSE}}$

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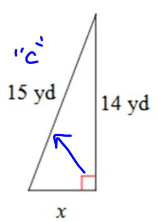
Find the missing side length for the triangles.

"c"



$a^2+b^2=c^2$

$x^2+14^2=15^2$

$x^2+196=225$

$\sqrt{x^2}=\sqrt{29}$

$\boxed{x=5.38\text{yds}}$

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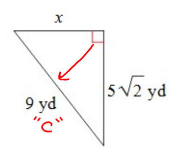
TOYO:
Find the missing side length for the triangles.



$x^2+(5\sqrt{2})^2=9^2$

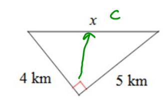
$x^2+(5\sqrt{2}\cdot 5\sqrt{2})=81$

$x^2+25\sqrt{4}=81$

$x^2+50=81$

$\sqrt{x^2}=\sqrt{31}$

$\boxed{x=5.56\text{yds}}$



$4^2+5^2=x^2$

$16+25=x^2$

$\sqrt{41}=\sqrt{x^2}$

$\boxed{x=6.4\text{km}}$

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Do these side lengths form a triangle

THEOREM *For Your Notebook*

THEOREM 5.12 **Triangle Inequality Theorem**

The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

$AB + BC > AC$ $\quad AC + BC > AB$ $\quad AB + AC > BC$

Proof: Ex. 47, p. 334

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Example:
Test if the three side lengths given form a triangle:
5 cm, 6 cm, 10 cm

Does?

$5+6>10$ ✓

$6+10>5$ ✓

$5+10>6$ ✓

yes its a triangle

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Example:

Test if the three side lengths given form a triangle:

5 cm, 3 cm, 10 cm

$5+3>10$ NO

so not a triangle

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Practice & HW

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