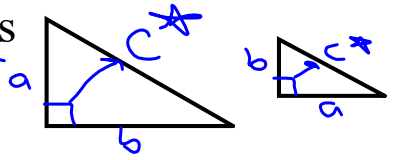
Right Triangles and Pythagorean Theorem

Mrs. Theo
3/6/23
Notes

Pythagorean Theorem

- $a^2+b^2=c^2$
  - > This formula helps you to **find the length** of **any side** of a **right triangle** given 2 other sides
  - > **c is the Hypotenuse** (the longest side across from the right angle), a and b are the other two sides known as Legs

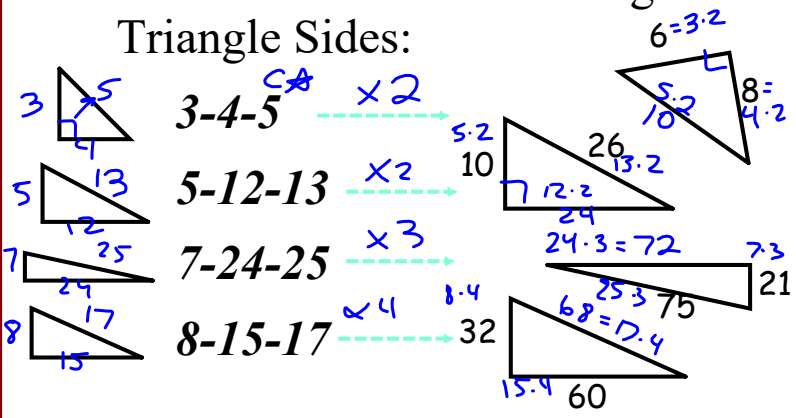


$a^2+b^2>c^2$ acute triangle 'c' is not long enough

$a^2+b^2<c^2$ Obtuse triangle 'c' is sooo big

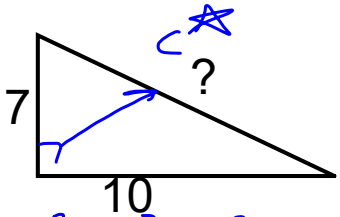
Pythagorean Triples and families

- > Well known combos of Right Triangle Sides:

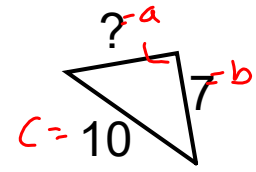


- > Any multiples of the above will also make right triangles

Find the missing side



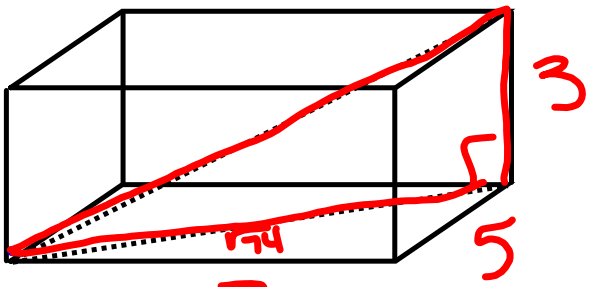
$a^2+b^2=c^2$
$7^2+10^2=c^2$
$49+100=c^2$
$\sqrt{149}=\sqrt{c^2}$
$12.21=c$



$a^2+b^2=c^2$
$a^2+7^2=10^2$
$a^2+49=100$
$-49 \quad -49$
$\sqrt{a^2}=\sqrt{51}$
$a=7.14$

Pythagorean Theorem in Space (Cont.)

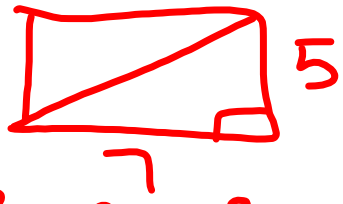
Example #1 **A rectangular solid has dimensions of 3, 5, and 7. Find the length of one of the diagonals.**



$3^2 + (\sqrt{74})^2 = c^2$

$9 + 74 = c^2$

$c = \sqrt{83}$



$5^2 + 7^2 = c^2$

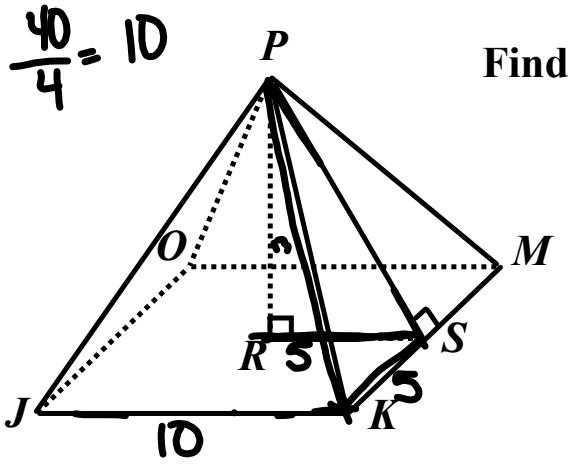
$25 + 49 = c^2$

$c = \sqrt{74}$

9.8 - Pythagorean Theorem in Space (Cont.)

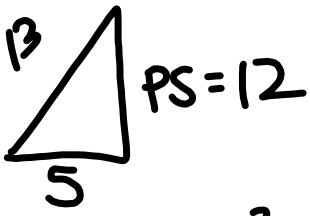
Example #2 **A regular square pyramid below has an altitude of PR and a slant height of PS. The perimeter of JKMO = 40 and PK=13.**

$\frac{40}{4} = 10$

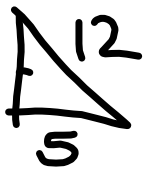


Find: **a.) JK** $= 10$

b.) PS



c.) PR



$5^2 + b^2 = 12^2$

$b = \sqrt{144 - 25} =$

$\sqrt{119}$

PS is called the *slant height* and is perpendicular to a side of the base.