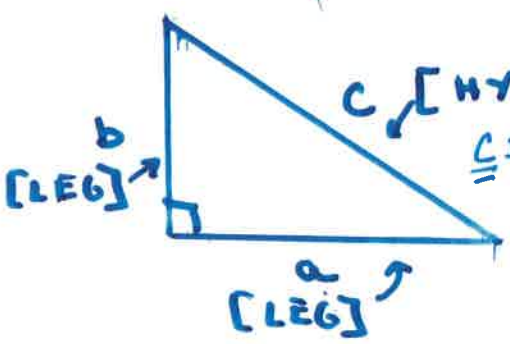
11-4 PYTHAGOREAN THEOREM

DEFINITION: IN A RIGHT TRIANGLE...

(hypotenuse)^2 = (leg)^2 + (other leg)^2

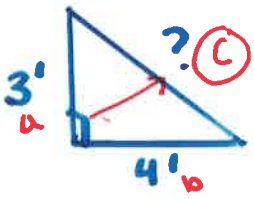
Formally, a + b are legs and c is the hypotenuse, Then... $\boxed{a^2+b^2=c^2}$

DIAGRAM:



IT DOES NOT MATTER WHICH LEG YOU LABEL A + B

EX 1 FIND THE LENGTH OF THE HYPOTENUSE



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

$3^2 + 4^2 = c^2$

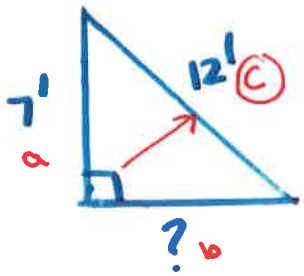
$9 + 16 = c^2$

$\sqrt{25} = \sqrt{c^2}$

$c = 5'$

DON'T FORGET UNITS!

EX 2 FIND THE LENGTH OF THE UNKNOWN LEG.



$7^2 + b^2 = 12^2$

$49 + b^2 = 144$

$-49 \quad -49$

$\sqrt{b^2} = \sqrt{95}$

$b \approx 9.75'$

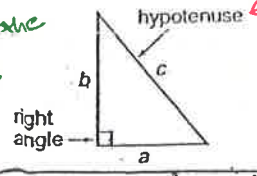
$a^2+b^2=c^2$ for right triangles

The Pythagorean Theorem

IN CLASS – PRACTICE PROBLEMS

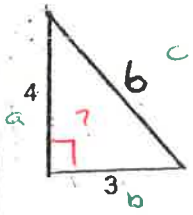
In a right triangle, the square of the hypotenuse, c, is equal to the sum of the squares of the lengths of the other two sides, a and b.

a+b are the legs



IS ALWAYS THE LONGEST SIDE ACROSS FROM THE RIGHT ANGLE

(1) IS THE FOLLOWING A RIGHT TRIANGLE?



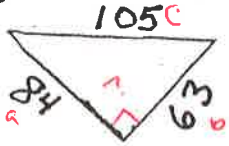
$4^2+3^2=6^2$

$16+9=36$

$25 \neq 36$

THIS IS NOT A RIGHT TRIANGLE (NOT RT △)

(2) RIGHT TRIANGLE?



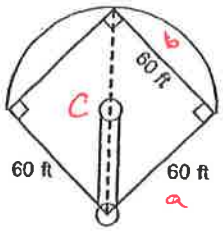
$84^2+63^2=105^2$

$11,025=11,025$ ✓

IT'S A RT △

Solve. Round decimal answers to the nearest tenth.

(3) In a softball game, how far must the catcher throw to second base?



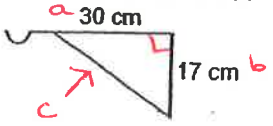
$60^2+60^2=c^2$

$\sqrt{7200}=\sqrt{c^2}$

$c=84.85$

The catcher throws 84.9 ft to 2B

(4) How long must the brace be on a closet rod holder if the vertical side is 17 cm and the horizontal side must be attached 30 cm from the wall?



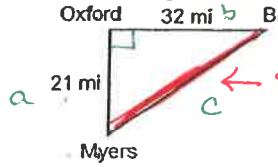
$30^2+17^2=c^2$

$\sqrt{1189}=\sqrt{c^2}$

$c=34.48$

Bracket must be 34.5 cm

(5) If Briny is 32 miles due east of Oxford and Myers is 21 miles due south of Oxford, how far is the shortest distance from Myers to Briny?



Shortest distance

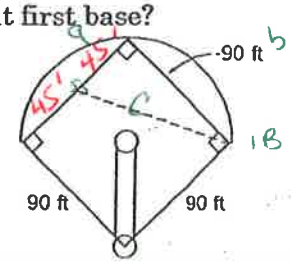
$21^2+32^2=c^2$

$\sqrt{1465}=\sqrt{c^2}$

$c=38.27$

The shortest distance is 38.3 miles

(6) In a baseball game, how far must the shortstop (halfway between second base and third base) throw to make an out at first base?



$45^2+90^2=c^2$

$\sqrt{10,125}=\sqrt{c^2}$

$c \approx 100.62$

The SS has to throw 100.6 ft to 1B