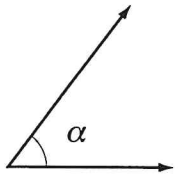
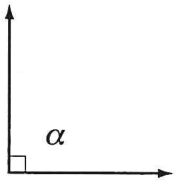
Geometry Facts

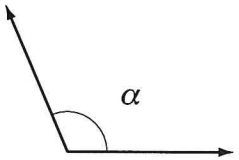
Types of Angles:



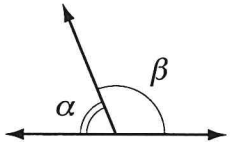
Acute angle
$0° < \alpha < 90°$



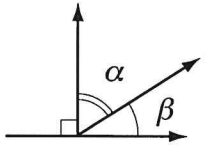
Right angle
$\alpha = 90°$



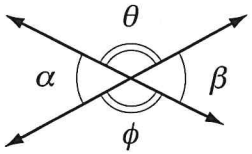
Obtuse angle
$90° < \alpha < 180°$



Supplementary angles
$\alpha + \beta = 180°$



Complementary angles
$\alpha + \beta = 90°$



Intersecting lines
$\alpha = \beta$ and $\phi = \theta$

Greek Letters

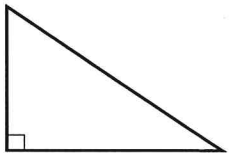
α - alpha
β - beta
γ - gamma

π - pi
θ - theta
ϕ - phi

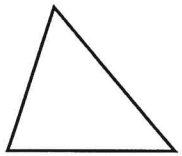
Vertical Angles

$\alpha = \beta$ & $\theta = \phi$

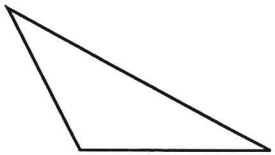
Types of Triangles:



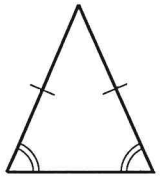
Right Triangle
One right angle



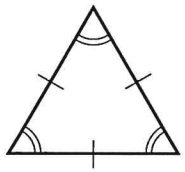
Acute Triangle
All angles are acute



Obtuse Triangle
One obtuse angle

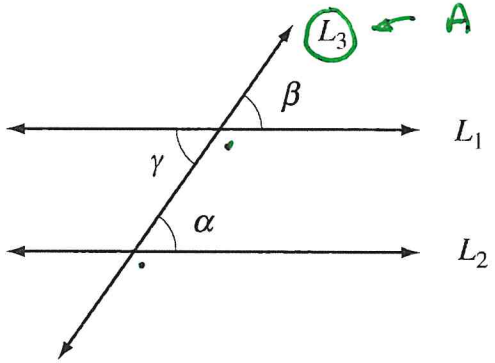


Isosceles Triangle
At least two sides equal
At least two angles equal



Equilateral Triangle
All sides equal
All angles equal

Two Parallel Lines Cut by a Transversal

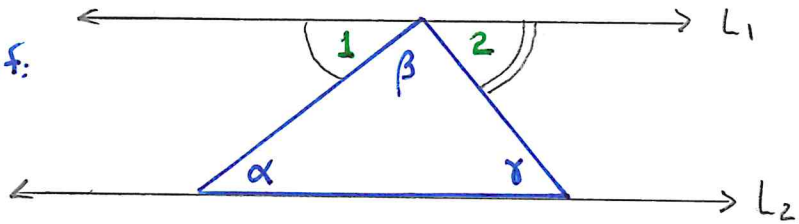


If two parallel lines L_1 and L_2 are cut by a third line L_3, then

$\alpha = \beta$ (corresponding angles are equal)

$\alpha = \gamma$ (alternate interior angles are equal)

Proof:



Draw $L_1 \parallel L_2$

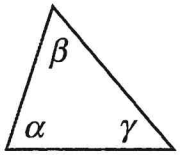
Now: $\angle 1 + \angle\beta + \angle 2 = 180°$

Note: $\angle\alpha = \angle 1$ and $\angle\gamma = \angle 2$

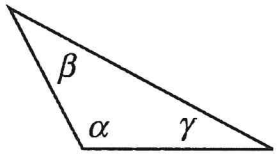
Thus $\angle\alpha + \angle\beta + \angle\gamma = 180°$

Triangle Angle Sum Theorem

The sum of the measures of the angles in any triangle is 180°.



$\alpha + \beta + \gamma = 180°$

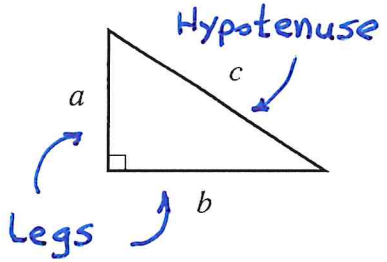


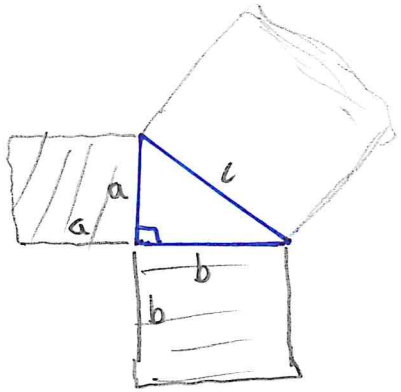
The Pythagorean Theorem

In any right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

In symbols:

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

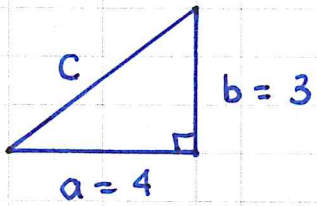




More on the Pythagorean Theorem

Ex. ① Find the missing side lengths:

a)



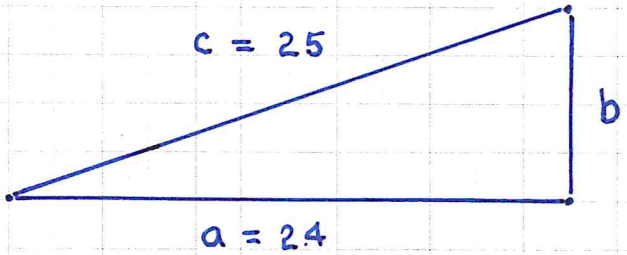
$a^2 + b^2 = c^2$

$4^2 + 3^2 = 16 + 9 = 25 = c^2$

$\Rightarrow \quad c = \sqrt{25} = 5$

3-4-5

b)



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

$24^2 + b^2 = 25^2$

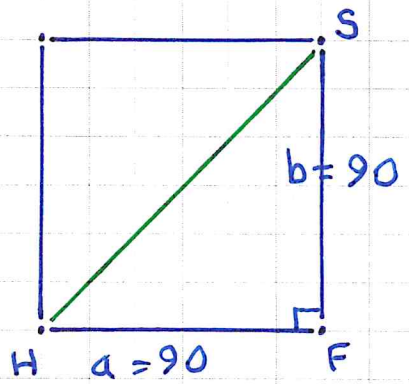
$576 + b^2 = 625$

$b^2 = 49$

$b = \sqrt{49} = 7$

7-24-25

Ex. ② Find the distance from home (H) to second base (S).



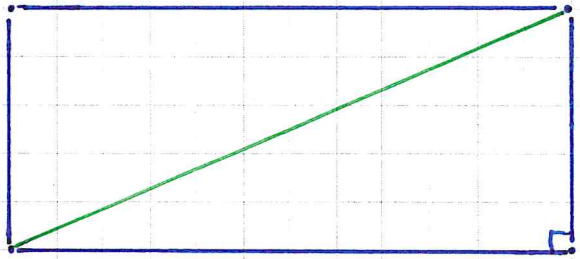
$a^2 + b^2 = c^2$

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

$8100 + 8100 = c^2$

$c^2 = 16\,200 \Rightarrow c = \sqrt{16\,200} \approx 127$ ft.

Ex. ③ Find the length of a diagonal of an American football field.



$53\frac{1}{3}$ yds.

160 ft.

100 yds = 300 ft.

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

$300^2 + 160^2 = c^2$

$c^2 = 115,600$

$c = \sqrt{115,600} = \underline{340 \text{ ft.}}$