Exam Hunter
Education Consulting

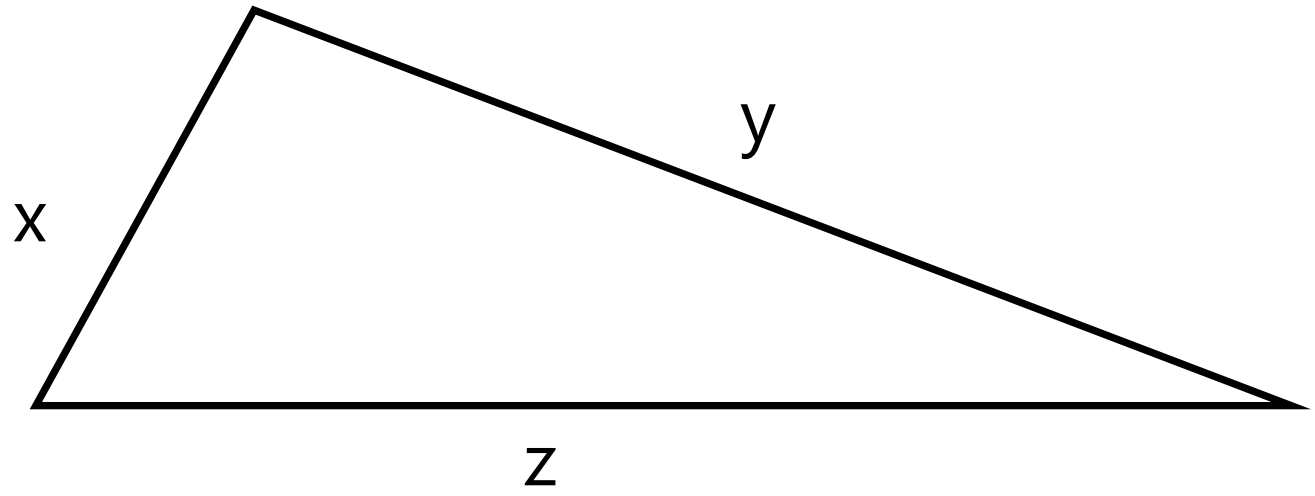
GEOMETRY
Triangle

Triangle

Polygons with 3 sides and 3 angles.

Inside angles = 180°

The combination of any two sides must be **more** than the third one.



Copyright by PL Consulting

Inside angle = 180 (1)

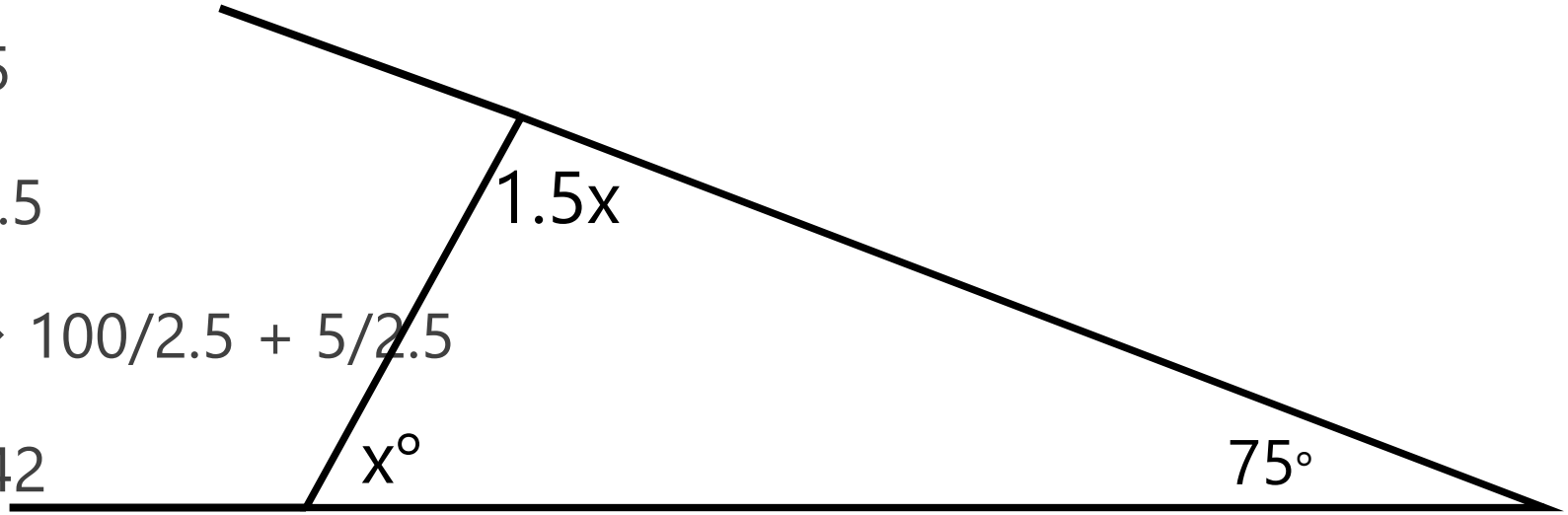
2.5x + 75 = 180

2.5x = 105

X = 105/2.5

105/2.5 → 100/2.5 + 5/2.5

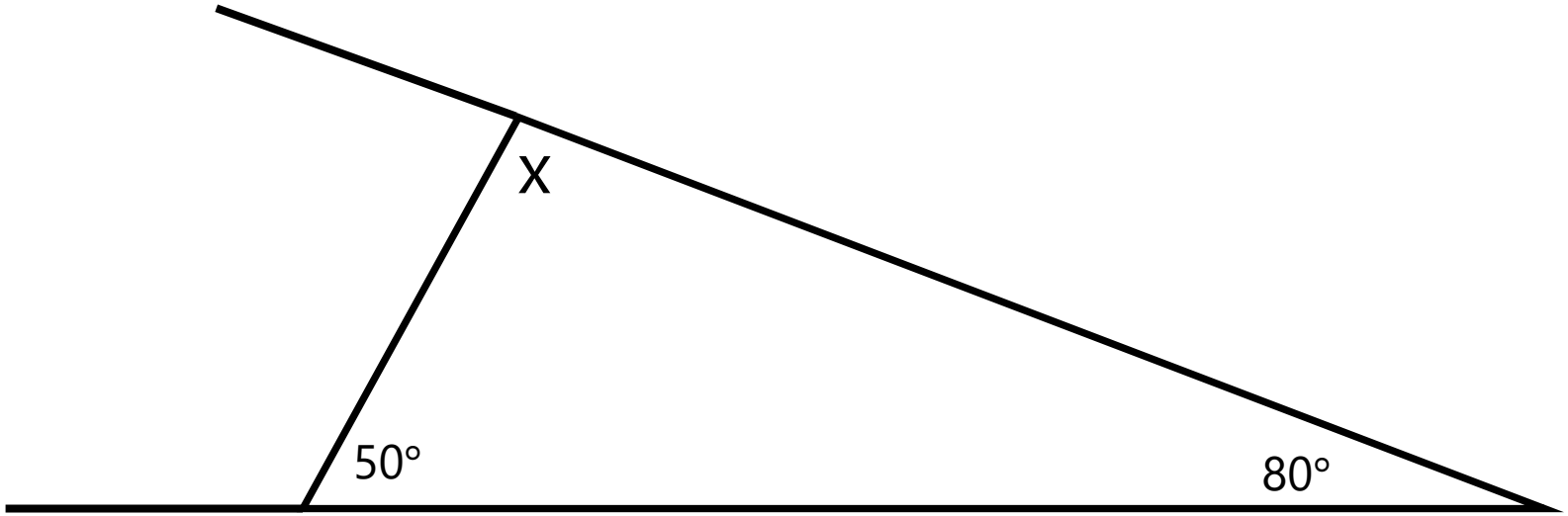
40 + 2 = 42



1.5 *42 = 42 + 0.5*42 = 42 + 21 = 63

Copyright by PL Consulting

Inside angle = 180 (2)



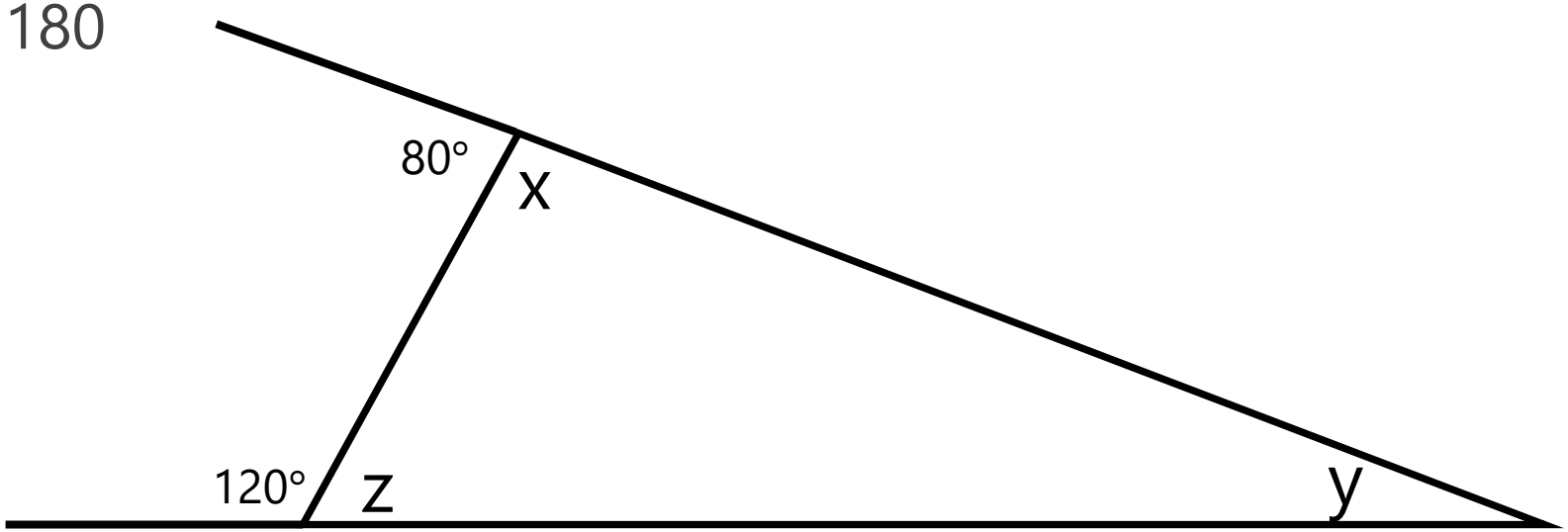
Copyright by PL Consulting

Inside angle = 180 (3)

X + 80 = 180
z + 120 = 180

120 = x+y

80 = z+y



****

Copyright by PL Consulting

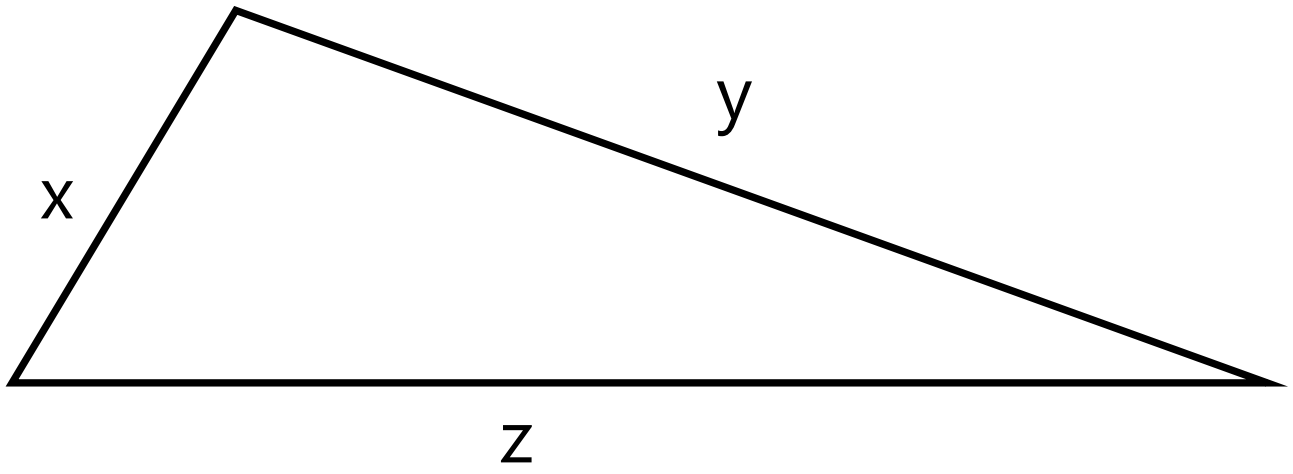
Which is not possible?

The combination of any two sides must be **more** than the third one.

X = 3, y = 3, z = 5

X = 4, y = 2, z =7

X = 5, y = 8, z = 18

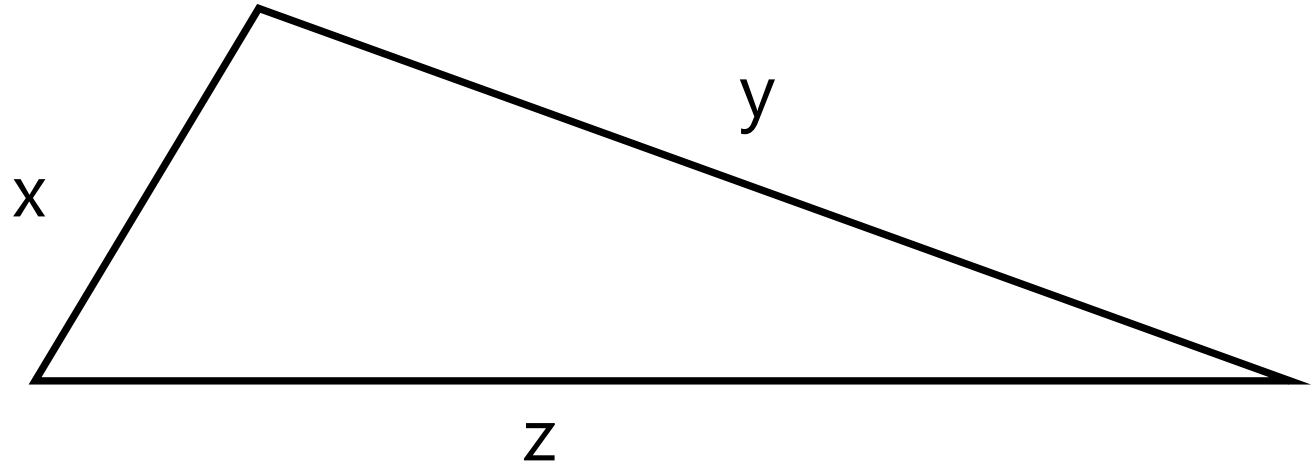


Copyright by PL Consulting

Length of three sides (2)

If x = 5 and z = 12

Can y = 7?



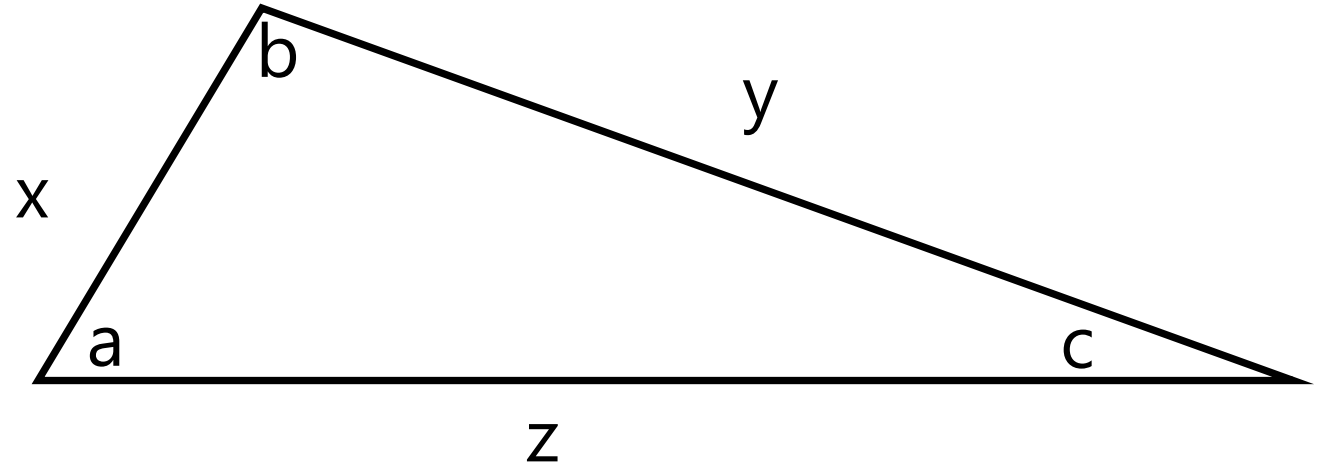
Copyright by PL Consulting

Length and Angle

The length of the longest side is opposite to the largest angle.

The length of the shortest side is opposite to the smallest angle.

If z > y > x then b>a>c



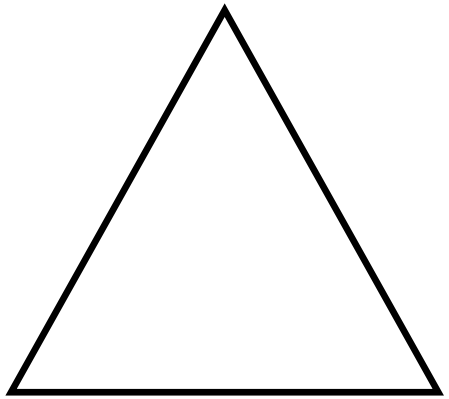
Copyright by PL Consulting

Equilateral Triangle

Each side is equal

Each angle is 60

Regular polygon



Copyright by PL Consulting

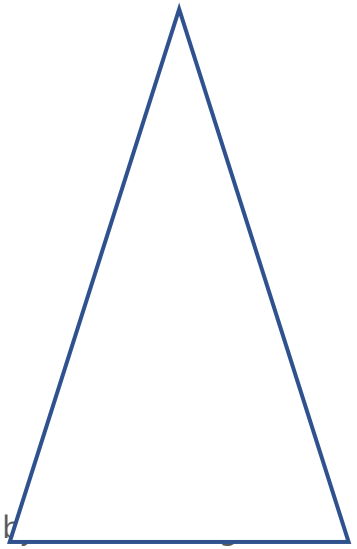
Isosceles

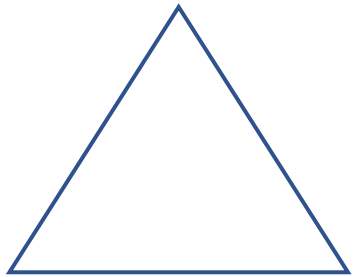
An isosceles triangle has at least two sides with the same length.

- So, an equilateral triangle is also an isosceles triangle, but an isosceles triangle is not always an equilateral triangle

The angles that are opposite the two sides are also equal.







Copyright b

Isosceles

45 45

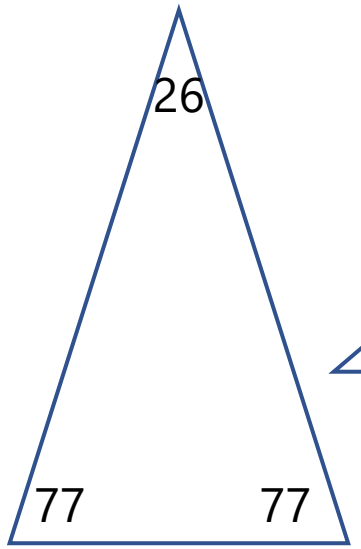
180 - 45*2

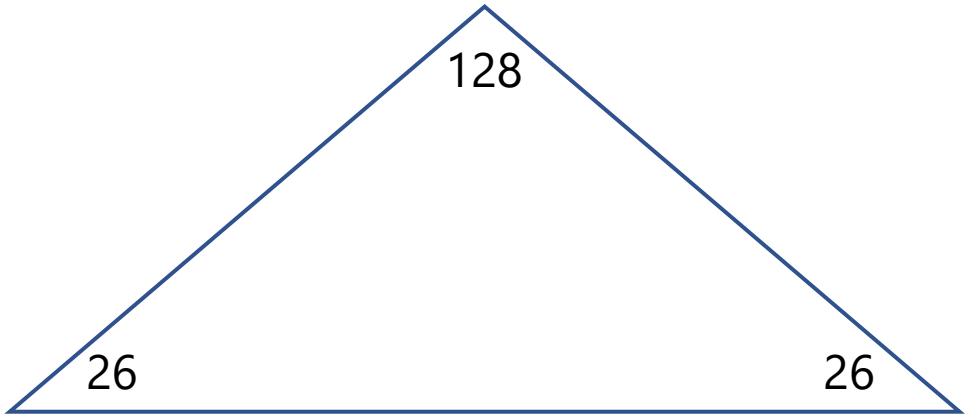
2y + 26 = 180

2y = 180-26 = 154

Y = 77

180 – 26*2 = 180 – 52 = 128





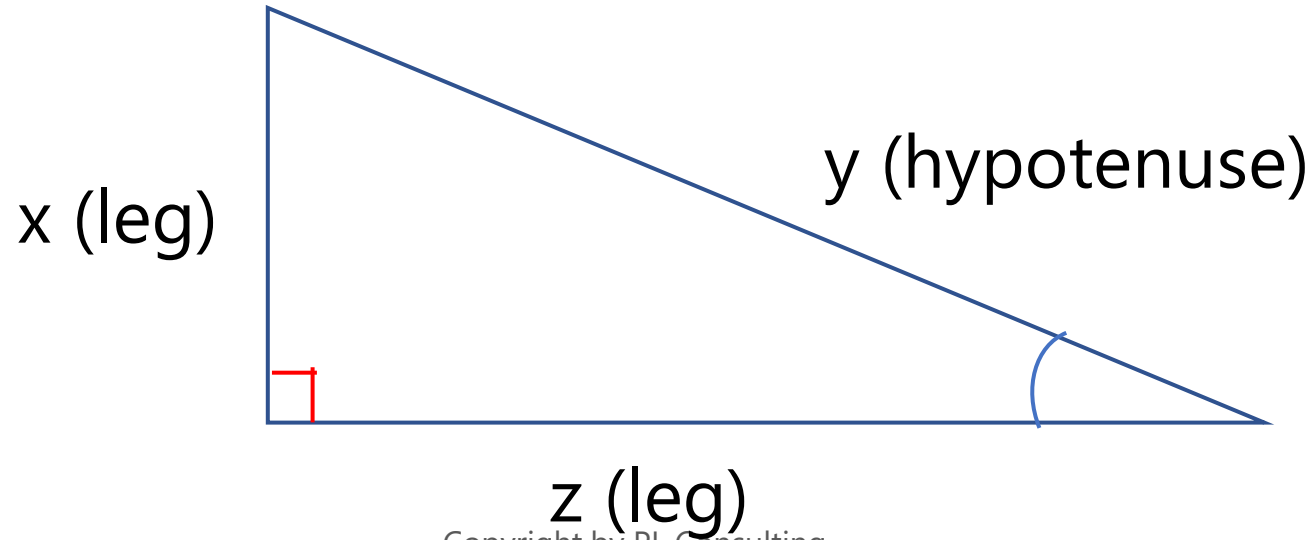
Copyright by PL Consulting

Right triangle

The side opposite the right angle is called **hypotenuse**

The other two sides, the sides that connect with the right angle, are called **legs**.

Since the combination interior angles is 180° the side opposite the right angle is always the longest.



Copyright by PL Consulting

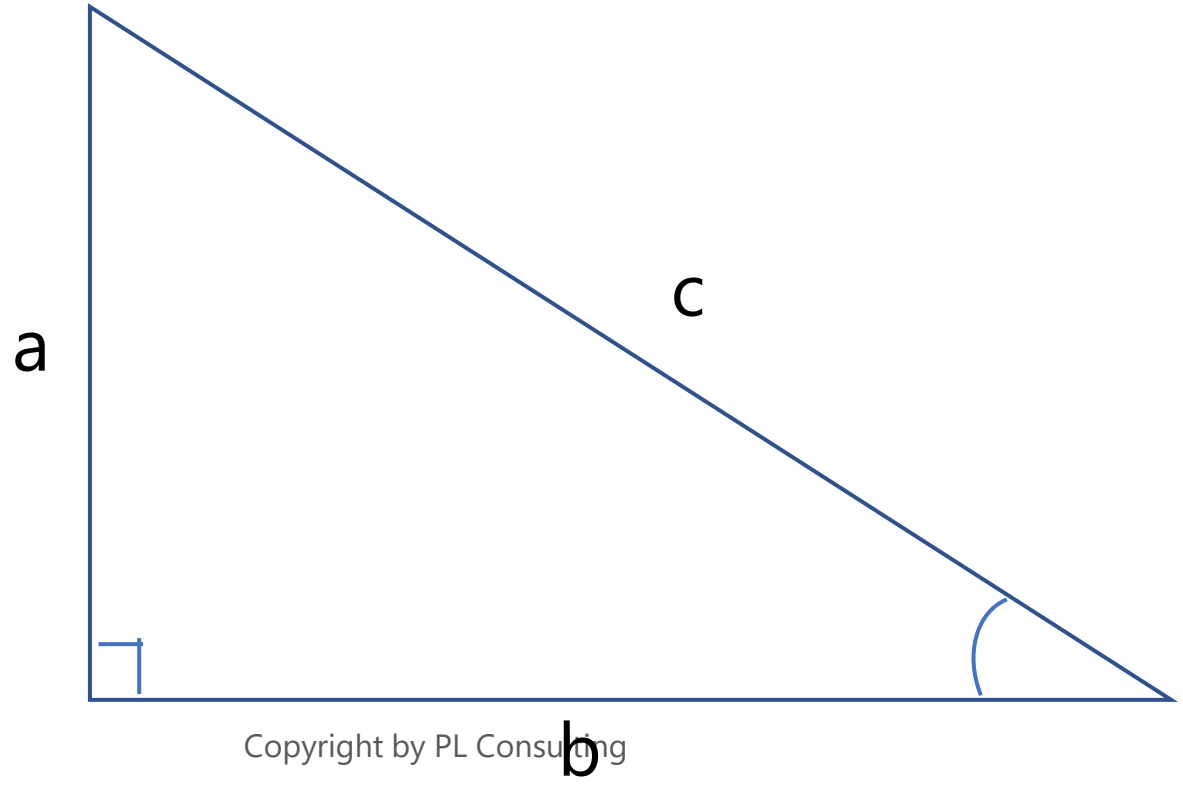
Exam Hunter
Education Consulting

GEOMETRY
Triangle Part 2

Pythagoras theorem

In a right triangle, the square of the length of the hypotenuse is equal to the sum of the square of the lengths of the legs

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



Copyright by PL Consulting

Pythagoras theorem (2)

If x = 3, and z = 4 then y = 3^2 + 4^2 = y^2

9 + 16 = 25 = y^2

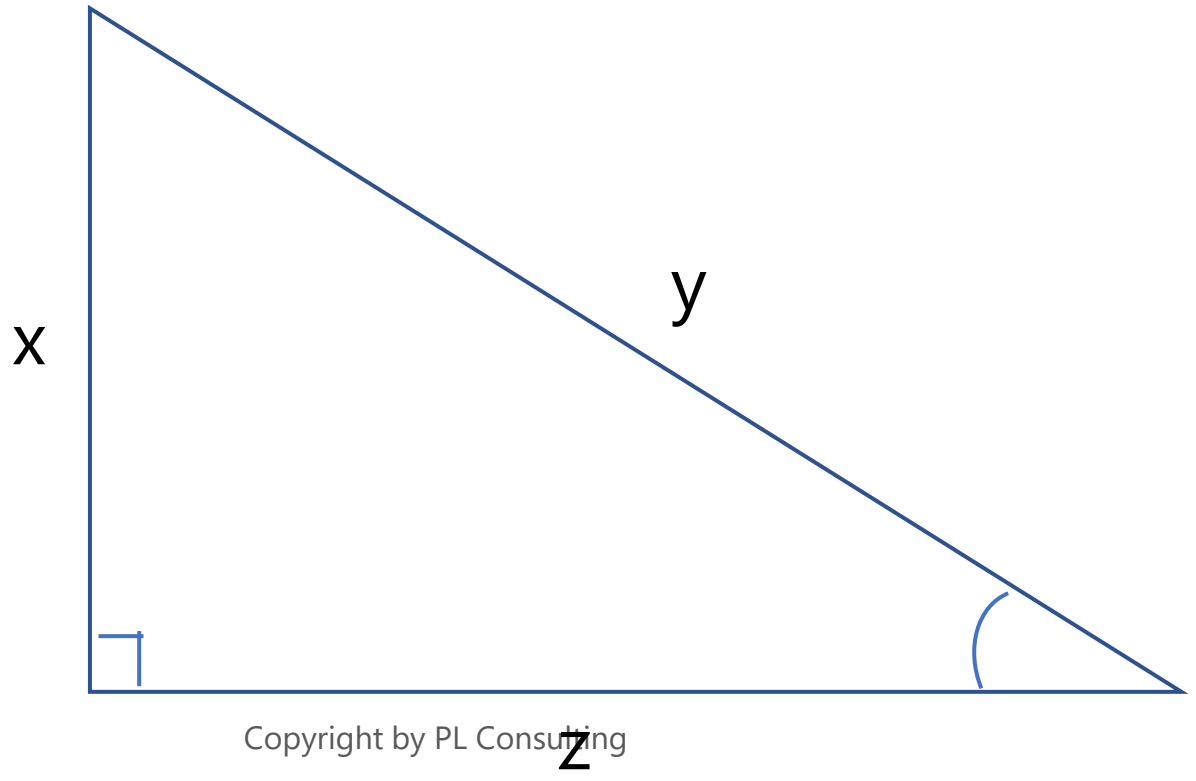
Y = 5

Y^2 = 25

Y = 5

A = 6 , b = 8, c = 10

A = 9, b = 12, C = 15



Copyright by PL Consulting

Pythagoras theorem (3)

A and B are legs and C is hypothenuse

$\boldsymbol{a^2+b^2=c^2}$ and $\boldsymbol{a^2=c^2-b^2}$

a = 6, b = 8, c = 10

a = 12, b = 16, c = 20

a = 5, b =12 , c = 13

a = 8, b = 15 , c = 17,,,, 17^2 = 8^2 + b^2 → 289 = 64 + b^2 ,,, 289 – 64 = 225

a = 1, b = 1, c = $\sqrt{2}$,,, 1^2 + 1^2 = c^2 → 2 = c^2 → c = $\sqrt{2}$

A = 7, b = 7, c = $7\sqrt{2}$

Copyright by PL Consulting

Pythagoras theorem (4)

The ratio can be the same

- 3, 4, 5 / 6, 8, 10/ 9, 12, 15
- 1, 1, $\sqrt{2}$ / 3,3, $3\sqrt{2}$ / k, k, k $\sqrt{2}$ / $3\sqrt{2}$, $3\sqrt{2}$, 6
- 5, 12, 13/ 10, 24, 26/ 15, 36, 39
- 8, 15,17 / 16,30,34
- 1, $\sqrt{3}$, 2

Copyright by PL Consulting

45 °, 45 °, 90 ° triangle

If a triangle is isosceles and is a right triangle the inner angles are 45 °, 45 °, 90 °

1 opposite 45 °

$\sqrt{2}$ opposite 90°

1:1: $\sqrt{2}$

Copyright by PL Consulting

45 °, 45 °, 90 ° triangle (2)

45 °, 45 °, 90 ° triangle

The size of the opposite sides can be as follows

1,1, $\sqrt{2}$

K, k, K$\sqrt{2}$

10, 10, 10$\sqrt{2}$

50 $\sqrt{2}$, 50 $\sqrt{2}$, 50$\sqrt{2} * \sqrt{2}$ = 50*2

20 $\sqrt{3}$, _20 $\sqrt{3}$ ___, _20 $\sqrt{3} * \sqrt{2}$ __ = 20 $\sqrt{6}$

_50 $\sqrt{3}$ __, _ 50$\sqrt{3}$ __, 50 $\sqrt{6}$

_100/ $\sqrt{2}$ _, _100/ $\sqrt{2}$ _, 100

_X/ $\sqrt{2}$ _, _X/ $\sqrt{2}$ _, X

Copyright by PL Consulting

30 °, 60 °, 90 ° triangle

**This triangle links with the ratio 1, $\sqrt{3}, 2$

1 opposite 30 °

$\sqrt{3}$ opposite 60 °

2 opposite 90°

Copyright by PL Consulting

30 °, 60 °, 90 ° triangle (2)

30 °, 60 °, 90 ° triangle

The size of the opposite sides can be as follows

1, _ $\sqrt{3}$ __, _2__

10, _10 $\sqrt{3}$ __, _20__

_5x__, _5x $\sqrt{3}$ __, 10x

_4/ $\sqrt{3}$ __, 4, _8/ $\sqrt{3}$ __

_10__, _10 $\sqrt{3}$ ___, 20

__100/ $\sqrt{3}$ _, 100, _200/ $\sqrt{3}$ __

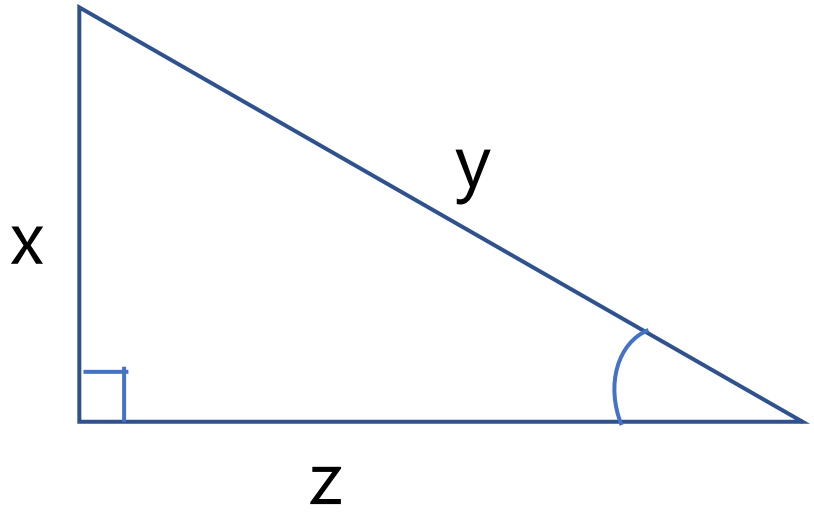
3$\sqrt{3}$, _9__, _6 $\sqrt{3}$ __

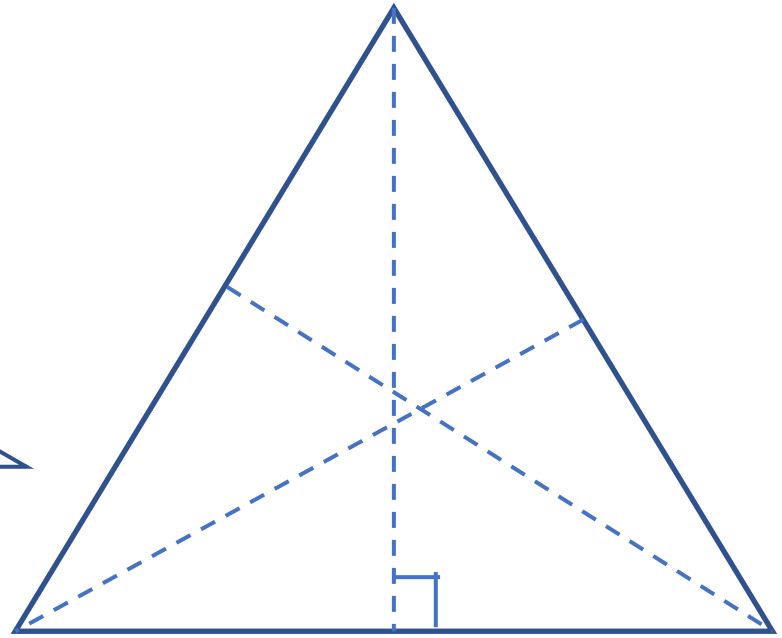
Copyright by PL Consulting

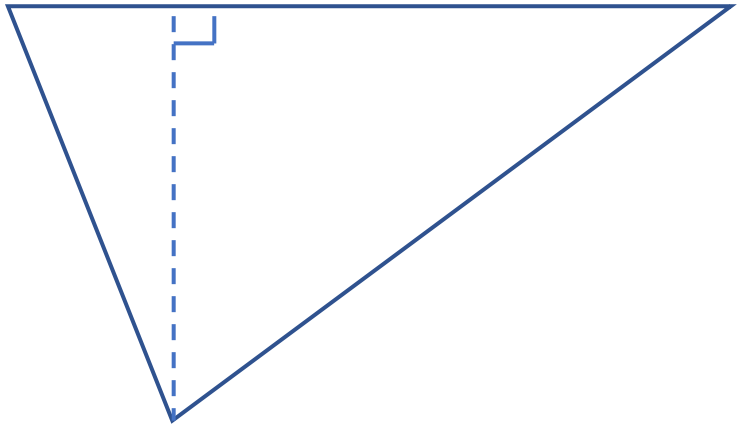
Area of a triangle

½ * length of the base* length of the altitude (height)

Altitude is the segment drawn from a vertex perpendicular to the opposite side.







Copyright by PL Consulting

Area of an equilateral triangle

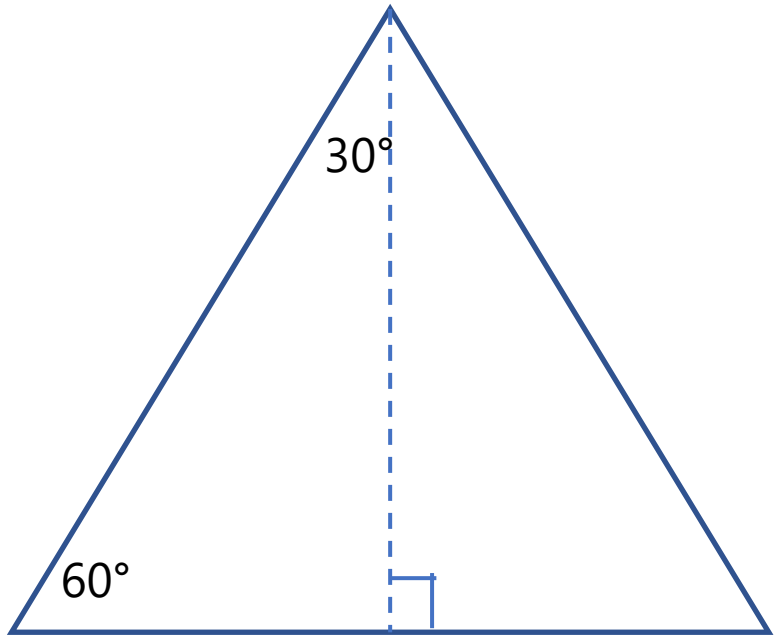
Proof using 30 °, 60 °, 90 ° triangle rule

If the size of each side is S

S/2,(S/2)* $\sqrt{3}$,S

½* S * (S/2)* $\sqrt{3}$

$$= \sqrt{3} * \frac{1}{2} * \left(\frac{S}{2}\right) * S$$

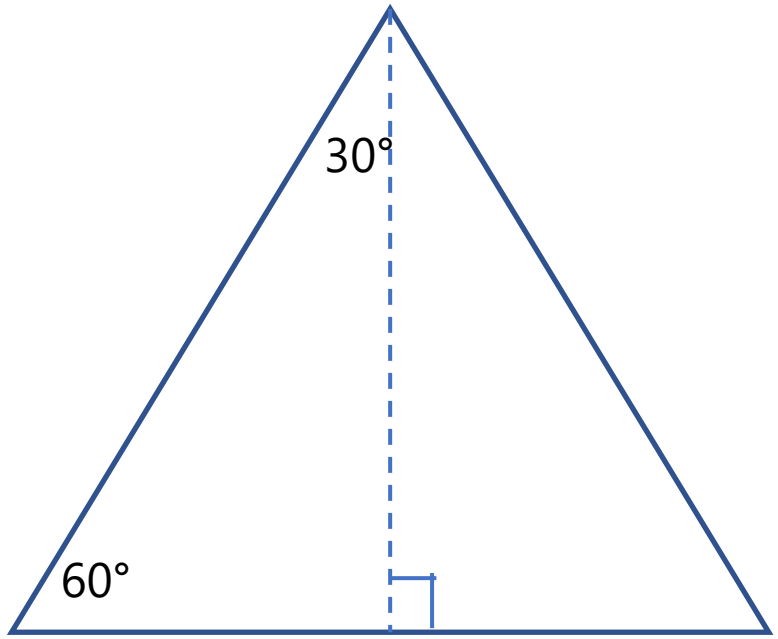


Copyright by PL Consulting

Area of an equilateral triangle

This gives the formular of equilateral triangle

$$\frac{\sqrt{3}}{4} side^2$$



Copyright by PL Consulting