MATHEMATICAL SKILLS

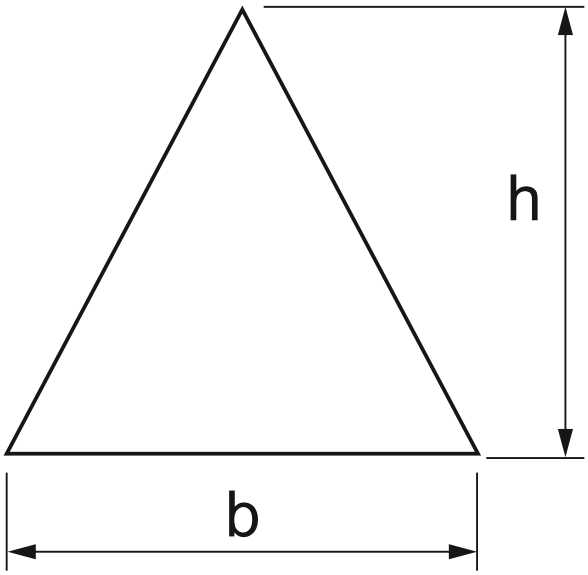
AREA OF A TRIANGLE
AND
ASSOCIATED EXAMINATION QUESTIONS

DESIGN AND TECHNOLOGY

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS https://www.facebook.com/groups/254963448192823/ www.technologystudent.com © 2017 V.Ryan © 2017

CALCULATING THE AREA OF A TRIANGLE

Definition: A triangle can be regarded as a polygon with three sides.



FORMULA

AREA = 1/2 X BASE X HEIGHT

AREA = 1/2 b x h

$$AREA = \frac{b \times h}{2}$$

SAMPLE QUESTIONS

A triangle has a base of 60mm and a height of 80mm

AREA = 1/2 X BASE X HEIGHT

$$AREA = \frac{60 \times 80}{2}$$

$$AREA = \frac{4800}{2}$$

AREA = 2400mm²

A triangle has a base of 40mm and a height of 50mm

AREA = 1/2 X BASE X HEIGHT

$$AREA = \frac{40 \times 50}{2}$$

$$AREA = \frac{2000}{2}$$

AREA = 1000mm²

A triangle has a base of 70mm and a height of 90mm

AREA = 1/2 X BASE X HEIGHT

$$AREA = \frac{70 \times 90}{2}$$

$$AREA = \frac{6300}{2}$$

AREA = 3150mm²

SAMPLE QUESTIONS

A triangle has a base of 100mm and a height of 120mm

$$\text{AREA} = 1/2 \times \text{BASE} \times \text{HEIGHT}$$

$$\text{AREA} = \frac{100 \times 120}{2}$$

$$\text{AREA} = \frac{12000}{2}$$

$$\text{AREA} = 6000\text{mm}^2$$

A triangle has a base of 75mm and a height of 50mm

$$\text{AREA} = 1/2 \times \text{BASE} \times \text{HEIGHT}$$

$$\text{AREA} = \frac{75 \times 50}{2}$$

$$\text{AREA} = \frac{3750}{2}$$

$$\text{AREA} = 1875\text{mm}^2$$

A triangle has a base of 45mm and a height of 55mm

$$\text{AREA} = 1/2 \times \text{BASE} \times \text{HEIGHT}$$

$$\text{AREA} = \frac{45 \times 55}{2}$$

$$\text{AREA} = \frac{2475}{2}$$

$$\text{AREA} = 1237.5\text{mm}^2$$

A triangle has a base of 110mm and a height of 130mm

$$\text{AREA} = 1/2 \times \text{BASE} \times \text{HEIGHT}$$

$$\text{AREA} = \frac{110 \times 130}{2}$$

$$\text{AREA} = \frac{14300}{2}$$

$$\text{AREA} = 7150\text{mm}^2$$

A triangle has a base of 300mm and a height of 400mm

$$\text{AREA} = 1/2 \times \text{BASE} \times \text{HEIGHT}$$

$$\text{AREA} = \frac{300 \times 400}{2}$$

$$\text{AREA} = \frac{120000}{2}$$

$$\text{AREA} = 60000\text{mm}^2$$

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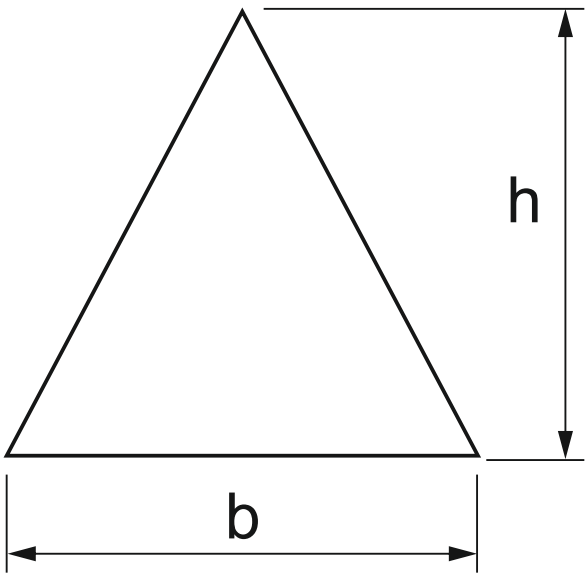


FORMULA

AREA = 1/2 X BASE X HEIGHT

AREA = 1/2 b x h

$$\text{AREA} = \frac{b \times h}{2}$$

SAMPLE QUESTIONS

A triangle has a base of 60mm and a height of 80mm

AREA = 1/2 X BASE X HEIGHT

A triangle has a base of 40mm and a height of 50mm

AREA = 1/2 X BASE X HEIGHT

A triangle has a base of 70mm and a height of 90mm

AREA = 1/2 X BASE X HEIGHT

SAMPLE QUESTIONS

A triangle has a base of 100mm and a height of 120mm

AREA = 1/2 X BASE X HEIGHT

A triangle has a base of 75mm and a height of 50mm

AREA = 1/2 X BASE X HEIGHT

A triangle has a base of 45mm and a height of 55mm

AREA = 1/2 X BASE X HEIGHT

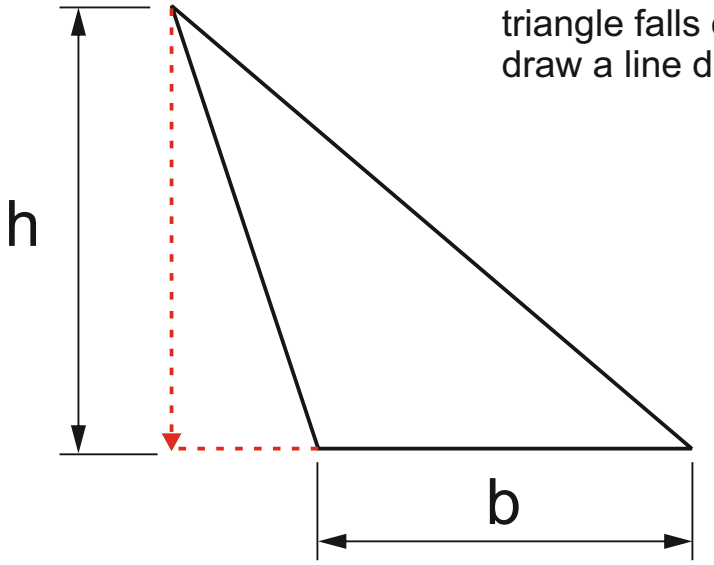
A triangle has a base of 110mm and a height of 130mm

AREA = 1/2 X BASE X HEIGHT

A triangle has a base of 300mm and a height of 400mm

AREA = 1/2 X BASE X HEIGHT

WHAT HAPPENS WHEN THE 'HEIGHT' FALLS OUTSIDE THE BASE?



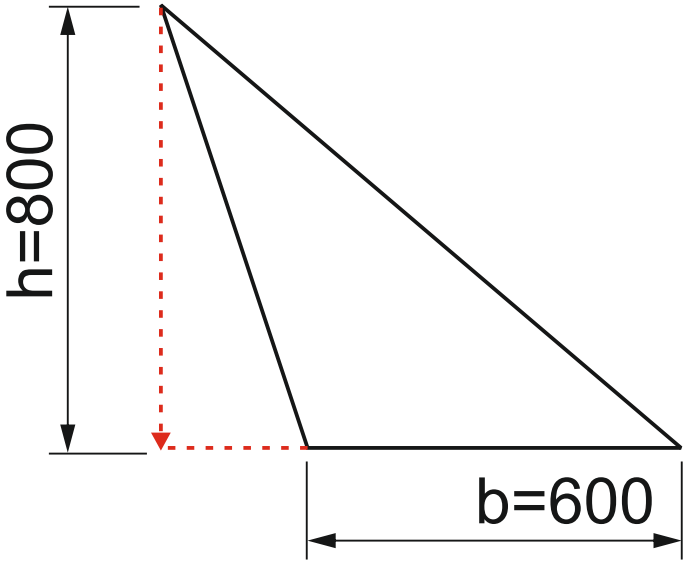
With an obtuse triangle, where the top (vertex) of the triangle falls outside the base, as seen opposite - simply draw a line down, as if with a plumb line.

FORMULA - REMAINS THE SAME

AREA = 1/2 X BASE X HEIGHT

AREA = 1/2 b x h

$$\text{AREA} = \frac{b \times h}{2}$$



AREA = 1/2 X BASE X HEIGHT

$$\text{AREA} = \frac{600 \times 800}{2}$$

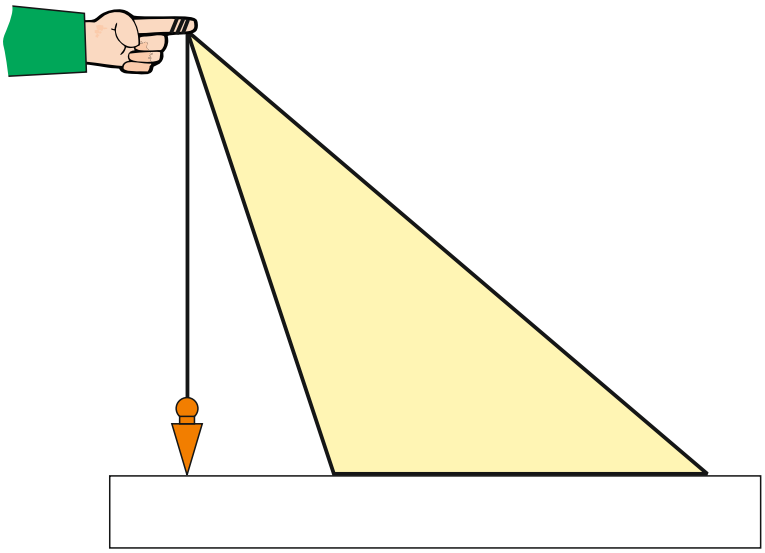
$$\text{AREA} = \frac{480000}{2}$$

AREA = 240000mm²

PRACTICAL EXERCISE:

Cut a number of obtuse triangles from 'brown' box cardboard.

Then calculate the areas of each triangle, using a plumb line to work out the height.



PRACTICAL QUESTIONS

Measure the height of each cardboard obtuse triangle, with the aid of a plumb line. Then, use the formula AREA = 1/2 X BASE X HEIGHT, to calculate each area.

CARDBOARD TRIANGLE 1

AREA = 1/2 X BASE X HEIGHT

BASE=

HEIGHT=

CARDBOARD TRIANGLE 1

AREA = 1/2 X BASE X HEIGHT

BASE=

HEIGHT=

CARDBOARD TRIANGLE 1

AREA = 1/2 X BASE X HEIGHT

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AREA = 1/2 X BASE X HEIGHT

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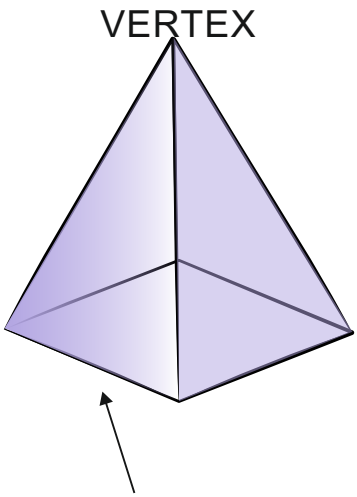
CARDBOARD TRIANGLE 1

AREA = 1/2 X BASE X HEIGHT

BASE=

HEIGHT=

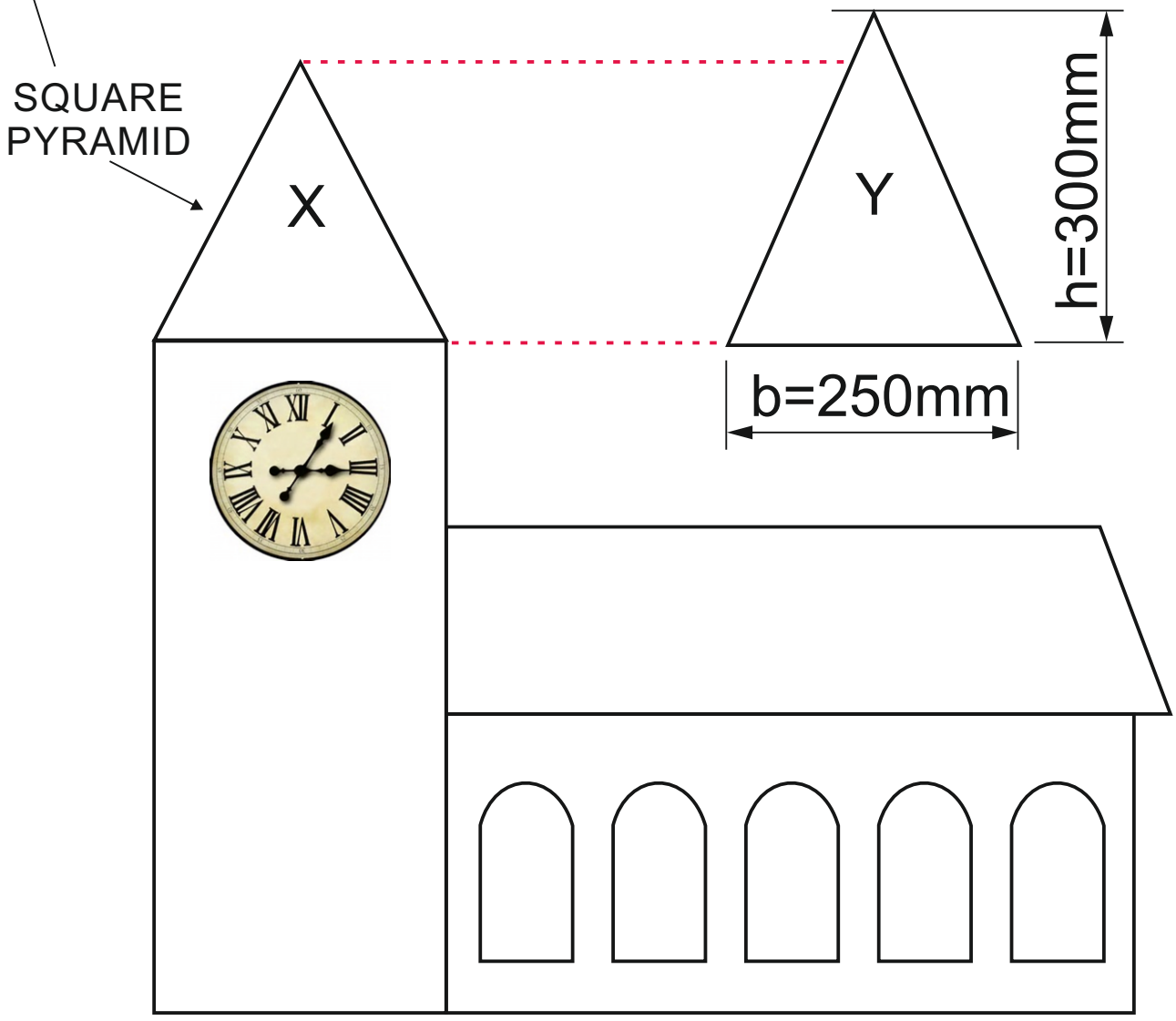
AREA OF A TRIANGLE - EXAMINATION QUESTIONS



Below is a model a typical village church.

The roof of the tower is a square pyramid.

1. What is the area of one side of the square pyramid?



AREA = 1/2 X BASE X HEIGHT

$$\text{AREA} = \frac{250 \times 300}{2}$$

$$\text{AREA} = \frac{75000}{2}$$

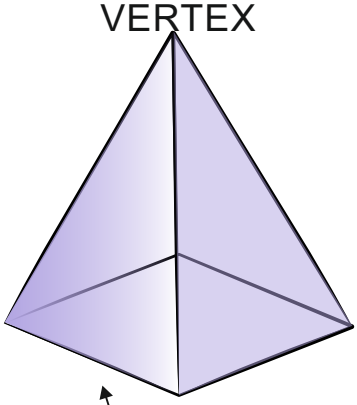
$$\text{AREA} = 37500\text{mm}^2$$

2. The labels X and Y represent the same part, one side of the square pyramid. Why does Y appear taller than X ?

'Y' appears taller than 'X', because each side of the square pyramid is tilted towards the pyramid's VERTEX, giving the appearance of it being shorter than it actually is.

'Y' is the side of the pyramid held perfectly straight upwards, not inclined / tilted towards the vertex. This gives us the actual 'true' shape of the triangle.

AREA OF A TRIANGLE - EXAMINATION QUESTIONS



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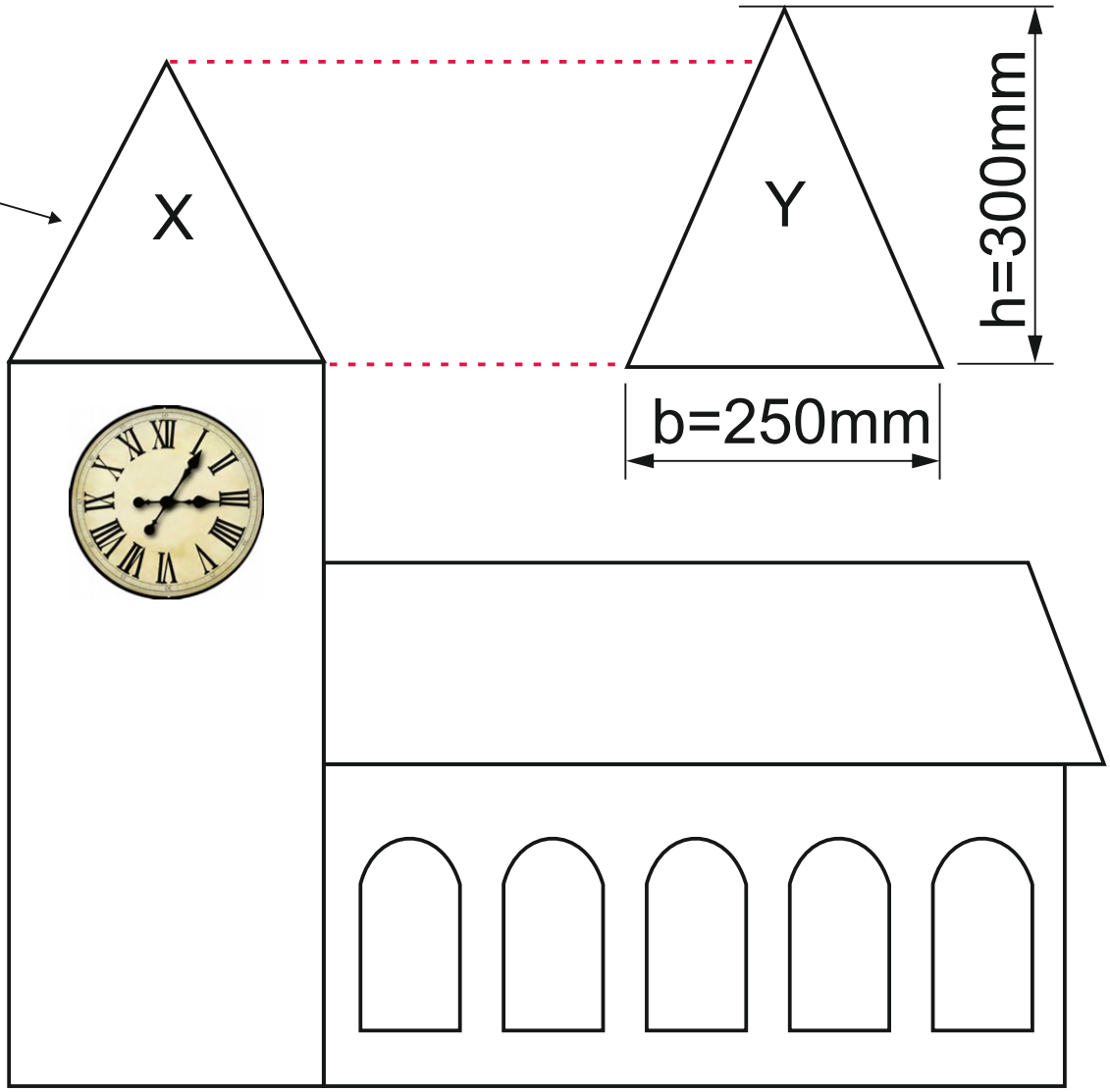

AREA = 1/2 X BASE X HEIGHT

2. The labels X and Y represent the same part, one side of the square pyramid. Why does Y appear taller than X ?