

Sums. The're Math Magic

17 – Sum Geometry

Please go through each slide stopping until you have understood the concept described

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We need to give you some proofs of theorems first.

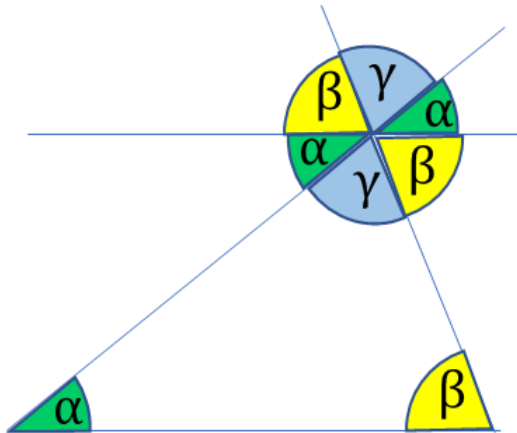
They are that the angles of a triangle add to 180° and

Thales Theorem about right angles in a circle.

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The angles of a triangle add to 180°



Proof:

Draw a line parallel to the base of the triangle.
The angles marked are the same.

$$\text{So } \alpha + \beta + \gamma = 180^\circ$$

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Thales Theorem about right angles in a circle.

Draw a circle with a diameter AB.

Draw a triangle with a point on the circumference using the diameter.

The angle at the point B = $\alpha + \beta = 90^\circ$, a right angle.

Join the point B to the centre O

Triangle AOC is an equilateral triangle so the angles α are equal.

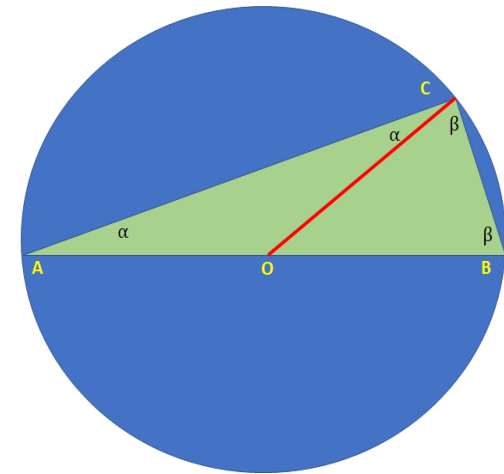
Similarly for BOC and those angles marked β

$$\text{So } 2\alpha + 2\beta = 180^\circ$$

$$\text{So } \alpha + \beta = 90^\circ$$

So the angle at C is always a right angle.

We will use this in the next problem.



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Square Roots and the Mesolabe Compass

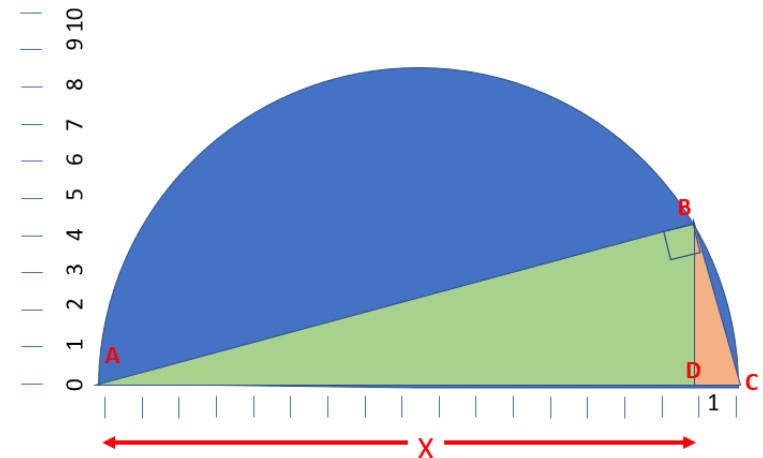
First documented by Hippocrates of Chios, this is a geometrical method of calculating square roots.

Using the circle in Thales Theorem.

Mark the diameter in equal intervals of one more than the number you wish to find the square root of – e.g. $X + 1$.

The height $BD = \sqrt{X}$

Why?



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Square Roots and the Mesolabe Compass

The triangles ADB and DBC are similar.

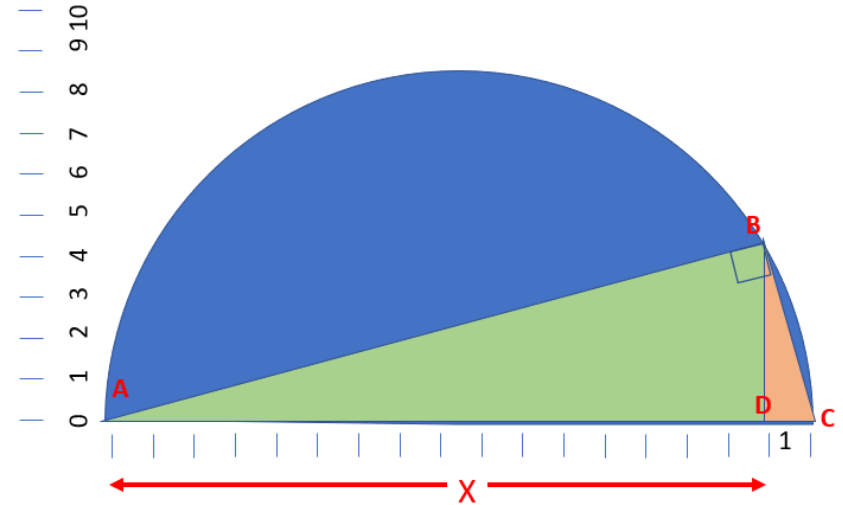
So the ratio DC to BD is the same as BD to AD

$$DC/BD \times AD/DB$$

$$\therefore DC \times AD = BD \times BD \text{ but } BD=1$$

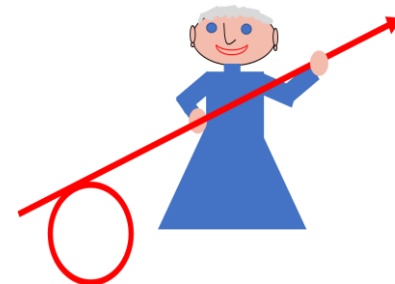
$$\therefore AD = BD \times BD$$

$$\text{So } BD = \sqrt{AD}$$



Why was maths class so long?

The teacher kept going off on a tangent !!



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Please go to the next lesson.

Sum Probability