Ages 9-14 pupil worksheet

The Wonderful Golden Rectangle

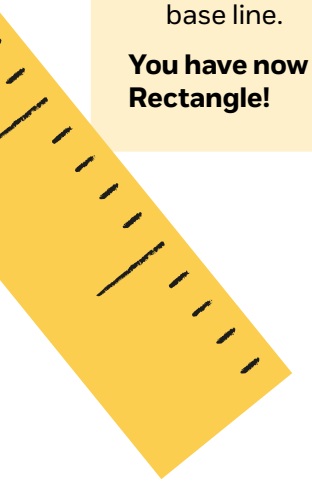
A bonus activity by Johnny Ball

You can use your knotted string to draw a golden rectangle!

"GOOD LUCK"
JOHNNY BALL

1. Draw a square accurately with sides measured 20cm each. This is the length of two knots lengths in your string.
2. Extend the top line and the base line to the right some distance.
3. Use your knotted string and stretch this horizontally to the right one knot length from the bottom left of the left-side of the square. Mark this spot with a pen or pencil.
4. From this spot, take your string and measure three knot lengths diagonally to the up and right, until you reach a point along the top line. Mark this spot with a pen or pencil and draw a line connecting this spot to the previous spot.
5. Draw a line down from this point to the base line.

You have now drawn a perfect Golden Rectangle!



In Mathematics, the 'Golden Rectangle', is a very pleasing oblong shape, often favoured by past artists like Salvador Dali and Leonardo Da Vinci. It was discovered around 500 BCE in Greece. The front of the famous Parthenon in Athens is said to fit perfectly into a Golden Rectangle.

It's referred to as the 'Golden Rectangle' as its shape is consistent with the 'Golden Ratio': 1.618.

For example, if the 'Golden Rectangle' short side is 1 unit, the long side will always be 1.618 units long.

In our case, the short side is two knot lengths (20cm). Then, the long side will be 2x1.618 = 3.236 knot lengths. This means the rectangle will be 20cm x 32.36cm and its sides are in Golden Ratio to each other.

The Golden Ratio – 1.618 can be found by constructing a series of Fibonacci Numbers.

Take the numbers 1 & 1 and add them to get 2. Now add the last two numbers (1 & 2) to get the next number (3) and continue the sequence.

You should end up with the Fibonacci Series 1, 1, 2, 3, 5, 8, 13, 21, 34, etc

You can continue the series further if you wish, by just adding the last two numbers to get the next one.

But now if you divide any number into the next number in the sequence, you will get ever closer to 1.618034, which is the Golden Ratio.

So your Golden Rectangle also has sides in the same Golden Ratio proportion:-

3.236 units / 2 units = 1.618,
The Golden Ratio.

Number Day is led by **NSPCC**

NSPCC

Tag us online: **#NumberDay**