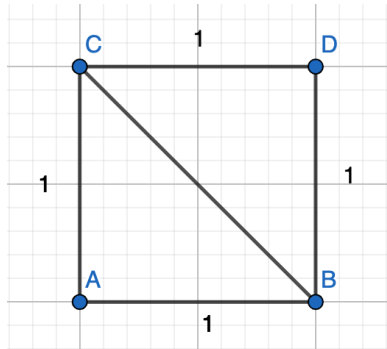


Phi - Φ

Phi is a number which is also called the **Golden Ratio**



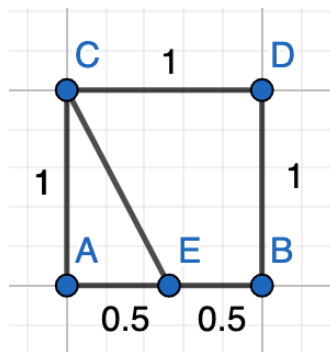
It can be made from drawing a square.

$$A = (0,0)$$

$$B = (1,0)$$

$$C = (0,1)$$

$$D = (1,1)$$

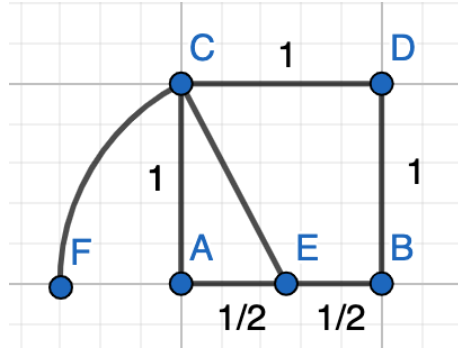


Now add $E(0.5,0)$, midpoint of \overline{AB} .

How long is the line \overline{EC} ?

$$\overline{EC}^2 = 1^2 + \left(\frac{1}{2}\right)^2$$

$$\overline{EC}^2 = \frac{5}{4} \text{ therefore } \overline{EC} = \frac{\sqrt{5}}{2}$$



Make a circle that has a centre at E and a radius of \overline{EC}

How long is the \overline{BF} ?

$$\overline{BF} = \overline{EF} + \overline{EB}$$

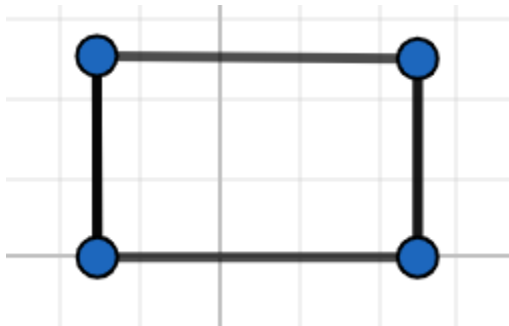
$$\overline{BF} = \frac{\sqrt{5}}{2} + \frac{1}{2}$$

$$\overline{BF} = \frac{1+\sqrt{5}}{2}$$

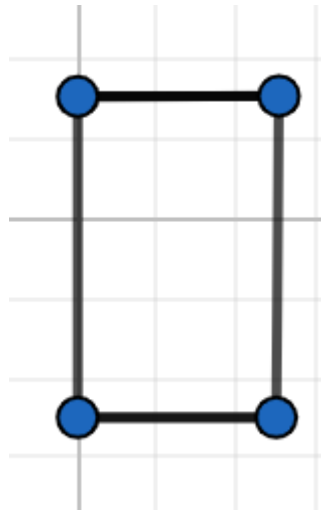
The length of \overline{BF} is Φ .

Use a spreadsheet to find Φ . as a number.

A rectangle that has sides of Φ and 1 is a **golden rectangle**. It looks like this.



or this



Faces and the Golden Rectangle

some people believe that the golden rectangle is the perfect shape.

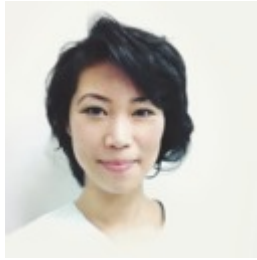
They also believe that peoples' faces are in the shape of a golden rectangle.

They think that if a face fits exactly inot a golden rectangle, then the face is very beautiful.

Let's see if that is true.

Question 1 Are human faces similar to a golden rectangle shape?

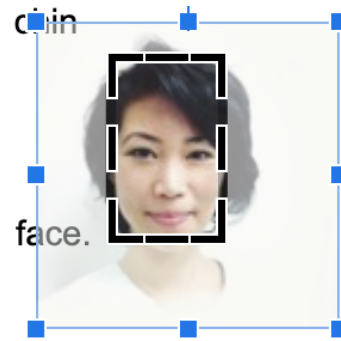
To do that we need



- a photo of a person's face.
- an app to measure the shape of their face.

In the app choose the cropping tool. Then select the face from

- the top of the head to the bottom of the chin



- from the left side to the right side of the face.

The app will give you the height and width of the face.

Size

Width

0.53



in

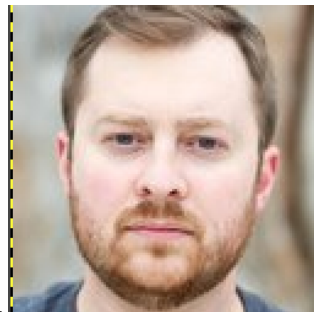
Height

0.84

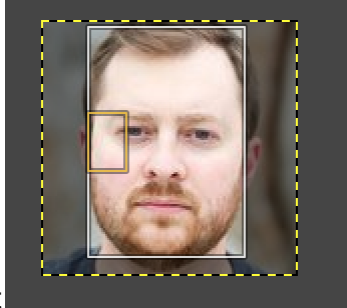


in

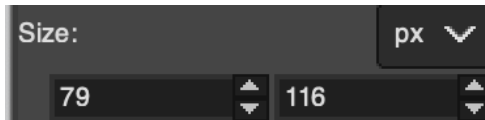
Now divide the height by the width to get the ratio for the face. $0.84 / 0.53 = 1.58$. So this face is not quite the same as the golden ratio.



Let's try another face.



Now crop it



Find the height and width

Calculate the height:width ratio = $116/79 = 1.48$

He is definitely not a golden rectangle face.