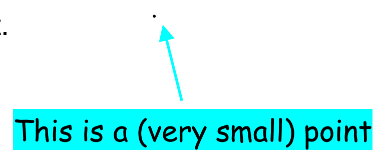
The basic basics of Sacred Geometry.

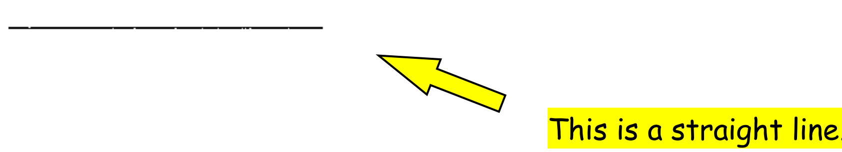
All you need for this is a pencil, a straight edge (it doesn't need to be a measuring ruler, but it does need to be straight), and a pair of compasses (the two-legged beasties with a point on one foot and a pencil on the other)
And now we can get started.

Take your pencil:
Let's start at the very beginning with a point.



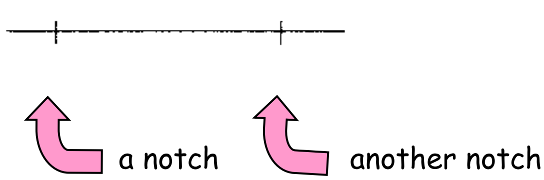
Point starts everything off. The first time you put your pencil onto the paper, you make a point.
Without a point, there is no point and there is nowhere to go.

Take your pencil and your straight edge/ruler:
Now, if you drag your pencil along the edge of a ruler, from your point, you get a straight line.



OK so far. Now we get technical. We're going to make something important.

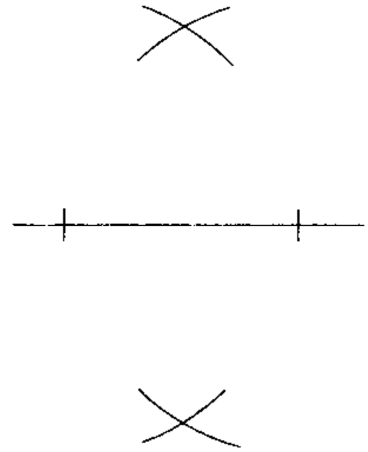
First, use your pencil to make a couple of notches on the straight line, like this.



Please take up your pair of compasses, and stay calm, as we turn the page.

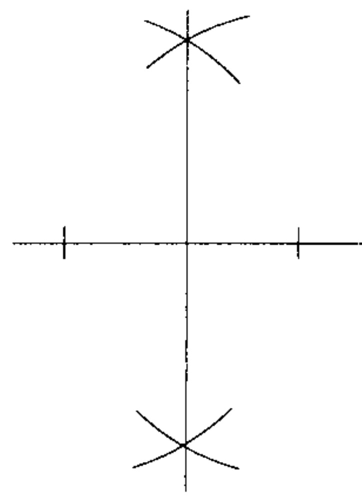
Now for some risky business.

Put the pointy end of the compasses onto
one of the notches.
Open out the compass legs so that the pencil
point sits on the other notch.
Keeping the pointy end in place, swing the pencil
around so that it makes part of a circle.
Then, change around and put the pointy end
of the compasses where the pencil was, and the
pencil where the point was.
Draw another part of a circle.
The two lines that you've just drawn with the
compasses will cross in two places, as we see
here.



And now the magic starts.

Where you've made the two crosses,
draw a line connecting the two – like this. →

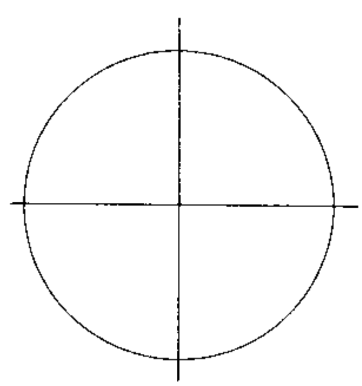


This is a perpendicular line.
The two lines are at RIGHT ANGLES to each other.
The new line is at 90º to the starting line.

(Someone a long time ago though it would be a
good idea to be able to measure around a circle
from the point in the centre. So they made
360 equal divisions which we call degrees, and
when you do what we've just done, the crossing
of the two lines can be thought of as the centre
of a circle, and we've divided it equally into
four sections, and 360 ÷ 4 = 90)

Two lines perpendicular to each other are *always* at 90º to each other.

To finish this bit off, take your pair of compasses
and put the pointy end on the point where the two
lines cross.
Open the compasses so that the pencil sits on
one of the notches (either one will do), and
draw a circle. Et voila!



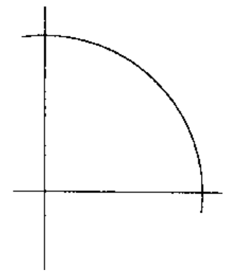
The circle with the four directions
North-South-East-West' the beginning of the
medicine wheel, the beginning of the celtic cross,
the beginning of the Dance of Shiva.

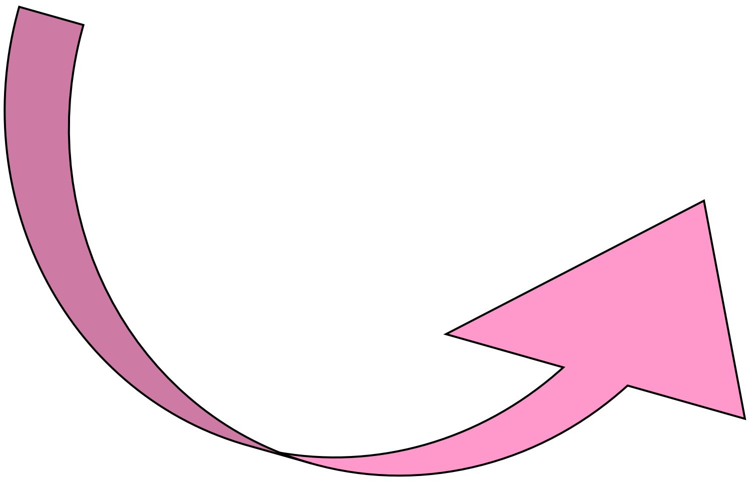
Whatever next? How about a SQUARE!

Now that we know how to make perpendicular lines, we can make squares and rectangles –anything based on a 90º angle.

Building a Square.

This time, we start with a straight line and make another perpendicular line, but we're only interested in one side of it. Like this:



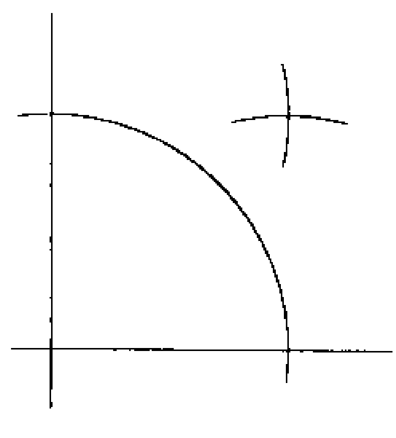


Now - as the drawing above shows, put your pointy compass end on the crossing of the two lines, and make a quarter of a circle. The arc of the circle (an arc is a part of a circle) crosses each of the two straight lines at the same distance from the point where the two lines cross.
This is because the radius of a circle (from the pointy end of the compasses to the pencil end of the compasses) is always the same distance all around a circle.

We've now made two sides of a square, and there's only a bit of trickery with the compasses needed to finish it.

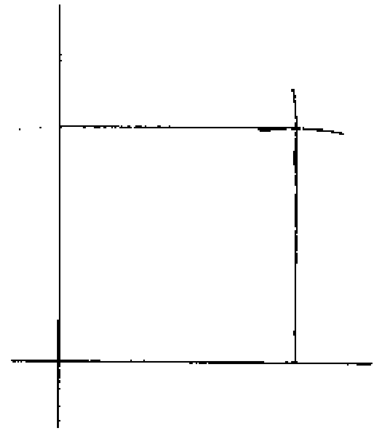
DON'T – whatever you do, alter the distance between the legs of the compass. (Phew, that was close)

Put the pointy end on one of the crossing places between straight line and arc. Draw part of a circle.
OK?
Now put the pointy end of the compass on the other crossing place between straight line and arc.
Draw part of a circle again.



Now, because you've kept the compass legs the same distance apart throughout this exercise, the radius of the arcs you've been drawing have become the length for the sides of a square.

With your straight edge, connect the points where the original arcs crossed the first two perpendicular lines, with the point where the latest arcs cross.



This is a Square!

Don't run away, but we're going to look at a bit of maths………I said, don't run away.

come back!

Oh well. I'll do it in friendly writing and a nice colour ---how's that.

Its like this:

measurements don't matter, because its all about *relationships*. Its about how one length, or angle, relates to another one.
A square is a square because each of its four sides are the same, and the angles between adjoining sides are always 90°.
A circle is a circle because the measurement from the centre-point of the circle to the circumference (the line of the circle itself) is always the same.

The Square Root stuff.

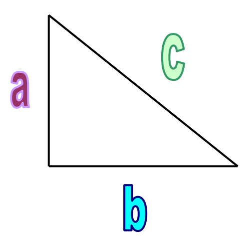
Sacred geometry recognises some very special relationships between lines and angles and there is some fairly awesome stuff out there………..
but it is easy (promise)

*******The Square Root hiding in the Square*******

WARNING: There's a formula coming up.

The old greek chap, Pythagorus, worked out a mathematical relationship about right angles and triangles.

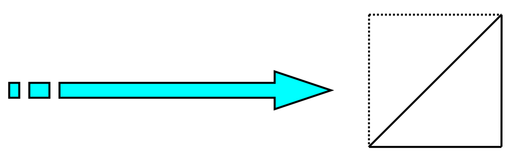
In a RIGHT ANGLE triangle (that's a triangle where one of the angles measures 90°)
he found that if you multiplied each of the two shorter sides by themselves (these are always the ones that make the 90° corner) and then added them together………..



so: (a x a) + (b x b)

then the answer was the length of the longer side multiplied by itself, or (c x c).

There is a triangle hiding in a square:



and if you say that the length of a side of a square
is 1 (one), what happens is this: (1 x 1) + (1 x 1), which is the same as saying 1 + 1,

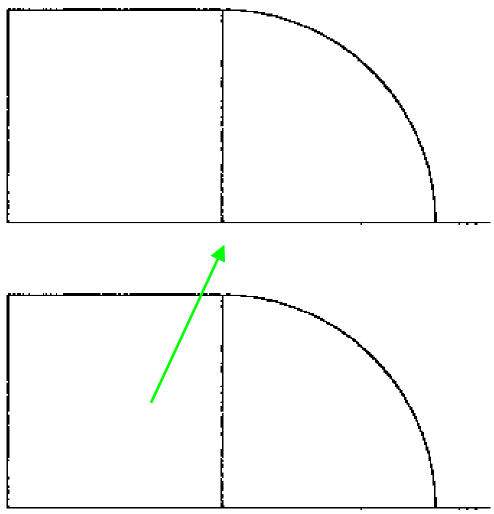
because one 1 is ONE, or to put it another way; 1 squared = one………….and 1 + 1 = 2.

But this is only the figure that you get from multiplying the actual length of the line by itself. It is the SQUARE of the original number.

So the actual length is called the SQUARE ROOT of this number.
And this is the Square Root of 2……………..written for convenience, as √2.

So this is the Root 2 model: the diagonal of a square.

And here’s another one, again using squares.



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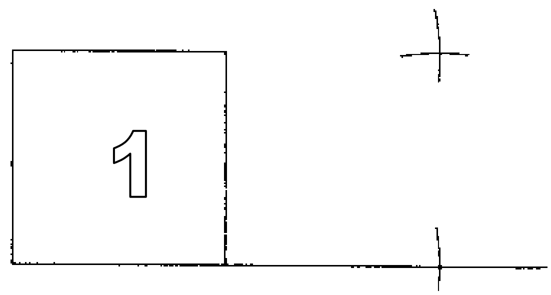
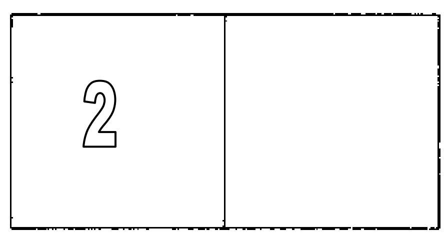
Remember how to make the square?

This time, make a square, and extend the bottom line to the right.
Then, with the compasses still at the same length between the point and the pencil, make a quarter circle from the top right hand corner to the extended line.

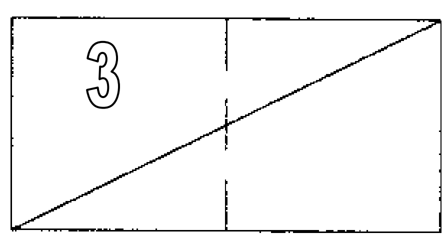
Now we do exactly what we did when making the first square to make a second square, which is connected to the first.
So, we use our compasses to find the top right hand corner of the new square: (dwg 1)



and we make our adjoining square: (dwg 2)



What does this mean?
well, its about diagonals again: (dwg 3)



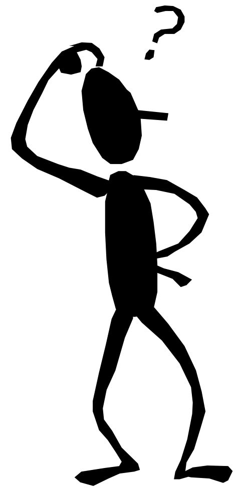
That pesky chap Pythagoras again:

If the side of the original square is 1, then the longer side must be 1 + 1 = 2.

Squaring the sides;
(1 x 1) + (2 x 2) = 5

So the length of the diagonal is √5

So this is the Root 5 model: the diagonal of a double square.



And what's this about the Golden Mean?

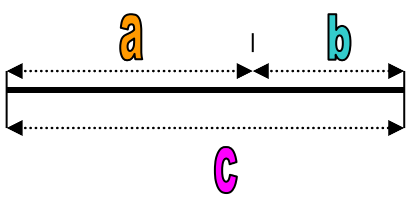
or the Golden Proportion?

or the Golden Section?

call it what you will, but it's a very special
relationship and seems to occur all over life,
at all kinds of scales and in all sorts of places.

What its about is the relationship between two lines:

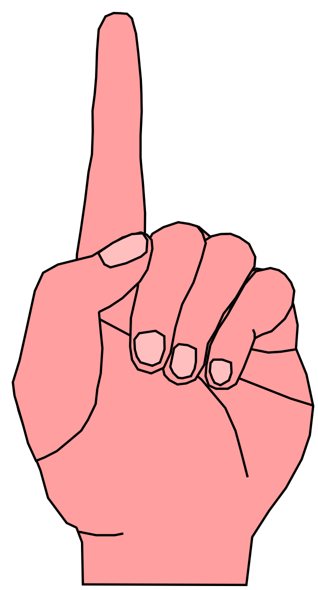
WARNING: maths again.



its when the relationship between a and b

is the same as that between c and a

There is a very elegant but altogether scary
mathematical proof of this……you don't want to know.



Anyway, the magic number is 1.618.

The full line (C) is 1.618
the longer portion (a) is 1
and the shorter portion (b) is 0.618

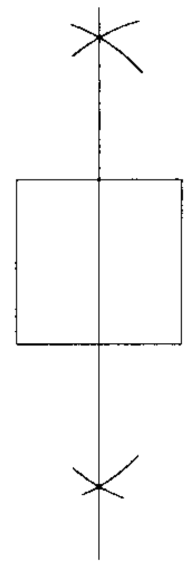
and from your calculator, you will see that
1 ÷ 1.618 = 0.618 (that's a ÷ c)
and
0.618 ÷ 1 = 0.618 (that's b ÷ a)

It's an absolutely unique relationship,
in this universe anyway.

And we can do it with a pencil, a straight edge and a pair of compasses.

Hooray!

Start again with a square – you know how to do
that by now.



Then: and here we branch out a bit –

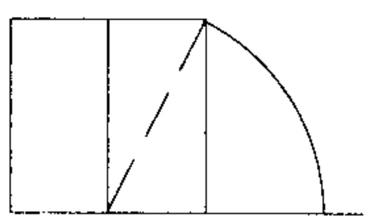
open out your compasses so that the point is on the top left hand corner of the square and the pencil is on the top right hand corner.
Draw part of a circle above the square.
Now put the pointy end of the compasses onto the top right hand corner of the square and draw another part of a circle above the square.

Now go to the bottom corners and do the same thing.
You will have made two crosses; one above and one below the square. Connect them together.

By keeping the compasses the same distance apart throughout the process, you have drawn a perpendicular line (remember that?) which cuts the square in half.

– it bisects it (technical term).

Next bit:

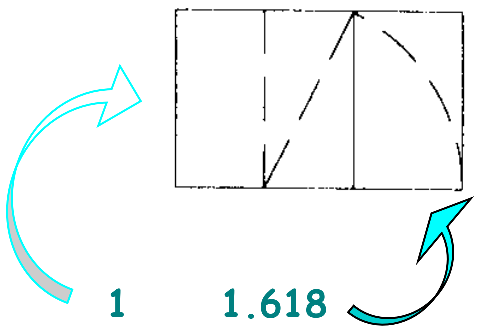


We only need the part of the vertical line within the square.
First, extend the bottom line of the square rightwards.
Then, put your compass point at the place where the bisecting line meets the bottom line of the square, and put the pencil on the top right hand corner of the square.
Draw an arc down to the extended line.

Now this looks very unlikely and doesn't seem to be going anywhere.
What kind of diagonal is this?

But Wait!

First, we need to finish this rectangle.



This very unlikely looking bit of geometry is actually a

Golden Mean

rectangle,

(and its nothing to do with diagonals)

If, as usual, we say that the side of the original square is 1, you will find that the longer side of the rectangle is 1.618, and that the extension that you've just built onto the side measures 1 by 0.618.

Its **amazing.**

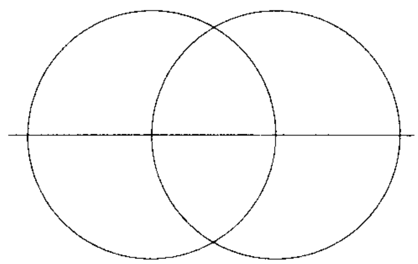
Enough of squares already!

OK:

meanwhile back at the Circle Ranch, there's some interesting interplay going on……….

THE SQUARE ROOT OF 3 AND THE VESICA PISCIS:

This all comes about by playing with compasses.



This is two circles, but in a very special relationship (again, as you'd expect).

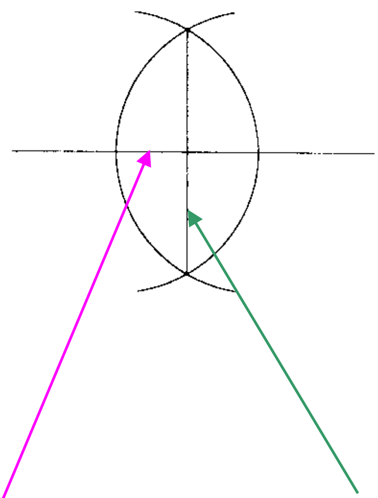
1. Draw a straight line.
2. Somewhere on the line, put the pointy end of your compasses and draw a circle.
3. Where the circle crosses the straight line, put the pointy end of your compasses and draw a second circle of the same size (important).

What have you done?

Well, because both circles are the same size (because you didn't alter the length between point and pencil on your compasses – did you?), the suggestive shape made by the interleaving of the two circles has a horizontal distance which is the radius of the two circles.

And if we say that this distance is 1 (as ever), then the vertical distance, where the circumferences of the two circles cross is………..√3.

Do you want me to prove it? I wouldn't if I were you. Faith is a wonderful thing.



This is 1. This is √3

AND:

That's all, Folks!