Q) Can geometric mean be negative?

Answer:

Yes, geometric mean can be negative.

But please note that we should <u>NOT</u> calculate it with the general formula of $x = \sqrt{ab}$

Eg:- Suppose an investment gives a return of 10%, 20% and -30% for three consecutive years. Then their average return is calculated as follows.

We carry out something called normalization.

So we write 10% as 1.1,

20% as 1.2

But -30% as 0.7.

Let us see what why we did that.

A return of 10% means if we have a hundred rupees, to start with, it would become 110 rupees.

A negative -30% means if you had 100 rupees it would become 70 rupees.

Now net geometric mean is $\sqrt[3]{(1.1 \times 1.2 \times 0.7)} - 1$

 We carry out this '-1' subtraction to bring it back to our original form.

$$= \sqrt[3]{(1.1 \times 1.2 \times 0.7)} - 1 = -0.021$$

This means -2.6% is the geometric mean of the net returns.