Hello, I got a hard problem and I'm not an expert on maths so I would love some help.

I play a game where there are 2 possible outcomes, win or lose. What if the chance of winning is let's say 55%, and I play this game, let's say 500 times, what is the chance of winning more than half of all games(so 250 out of all 500 games)? Or what is the chance of winning more than 52% of the games? Is there a formula for this? I tried looking it up on google but I couldn't find.

Would love if you answer :)

Hi! Here you should use this formula (don't be scared): $P_n(k) \approx \frac{e^{-\frac{x^2}{2}}}{\sqrt{2\pi npq}}, where\ x = \frac{k-np}{\sqrt{npq}}$(it named *de Moivre–Laplace theorem*)

In your task:

p=0.55

q=1-p=0.45

n=500

k=250

$$x = \frac{250 - 275}{\sqrt{500 \cdot 0.55 \cdot 0.45}} \approx 2.2473$$

$$P_{500}(250) \approx \frac{e^{-\frac{2.2473^2}{2}}}{\sqrt{2\pi 500 \cdot 0.55 \cdot 0.45}} = \frac{12.49}{27.88} = 0.448$$