

A glass contains 5 green sweets and m sweets of other colours. A sweet is taken at random.

a) Write down the probability that the sweet is green.

b) The sweet is replaced in the glass and the process is repeated a **further three times**. Each time, it is noted whether a green sweet is taken. The variance of the number of green sweets taken over the whole process is calculated to be 0.75.



Work out how many sweets in total there are in the glass.

a) There are 5 green sweets and m other sweets. There are $5 + m$ sweets altogether

$$\text{Probability that the sweet is green} = \frac{5}{5+m}$$

$$\text{b) Variance} = npq = 4 \times \frac{5}{5+m} \times \frac{m}{5+m}$$

$$4 \times \frac{5}{5+m} \times \frac{m}{5+m} = 0.75$$

$$\frac{20m}{(5+m)^2} = \frac{3}{4}$$

$$80m = 3(5+m)^2$$

$$80m = 3(25 + 10m + m^2)$$

$$80m = 75 + 30m + 3m^2$$

$$3m^2 - 50m + 75 = 0$$

$$(3m - 5)(m - 15) = 0$$

$$m = \frac{5}{3}, m = 15$$

The number of sweets must be an integer value, hence $m = 15$

Total number of sweets = 20

$$\text{Check answer: } 4 \times \frac{5}{5+15} \times \frac{15}{5+15}$$