# Sampling distribution of a sample proportion

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

**1.** For p = 0.3, n = 400, find sample-proportion mean and variance. [2 marks]

Variance = 0.3 × 0.7 / 400.

**Answer:** 0.3 and 0.000525.

**2.** For p = 0.25, n = 300, find sample-proportion SD. [2 marks]

$\sqrt{0.25(0.75)/300} = 0.025$.

**Answer:** 0.025.

**3.** Check normal expected-count conditions for p = 0.02, n = 100. [2 marks]

Expected failures are 98; both counts must be adequately large.

**Answer:** They fail: expected successes = 2.

**4.** For p = 0.5,n = 100, approximate $P(0.4 < \hat{p} < 0.6)$ without continuity correction. [2 marks]

SD = 0.05; standardised bounds are −2 and 2.

**Answer:** 0.9545 approximately.

**5.** Why cannot a sample of 20 have sample proportion exactly 0.333? [2 marks]

The numerator is an integer and the denominator is 20.

**Answer:** Possible values are integer multiples of 0.05.

**6.** Compare sample-proportion SDs for n = 150 and n = 600 with p fixed. [2 marks]

Quadrupling n divides the SD by two.

**Answer:** The second is half the first.