

Question 9

What value of  $k$  will make the function

$$F(x) = kx^3, \quad 0 \leq x \leq 2$$

a valid cumulative distribution function?

[2]

$$\int_0^2 kx^3 dx = \left[ \frac{kx^4}{4} \right]_0^2 = \frac{16k}{4} = 4k = 1$$

$$k = \frac{1}{4}$$

Question 10

Figure 4 shows diagrams of the probability mass functions of the binomial  $B(10, 0.5)$  and  $B(10, 0.25)$  distributions. Which is which? Give a reason for your answer.

[2]

(a)

(b)

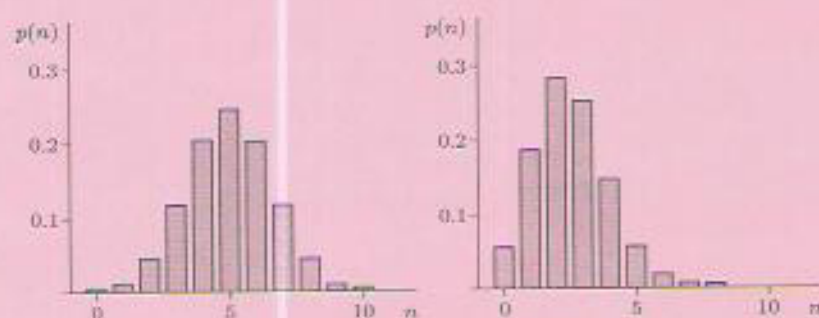


Figure 4

0.5

0.25

$B(10, 0.25)$  has a lower average  
 $B(10, 0.5)$  is symmetrical about 5.

Question 11

Suppose that a data set of measurements which cannot take negative values has sample mean 1 and sample variance 1. Why would the  $N(1, 1)$  distribution not be a suitable model for such data?

[1]

SD = 1, but the normal distribution has values less than zero, hence unsuitable