

4. A nursery has a sack containing a large number of coloured beads of which 14% are coloured red.

Aliya takes a random sample of 18 beads from the sack to make a bracelet.

- (a) State a suitable binomial distribution to model the number of red beads in Aliya's bracelet.

(1)

- (b) Use this binomial distribution to find the probability that

- (i) Aliya has just 1 red bead in her bracelet,  
(ii) there are at least 4 red beads in Aliya's bracelet.

(3)

- (c) Comment on the suitability of a binomial distribution to model this situation.

(1)

After several children have used beads from the sack, the nursery teacher decides to test whether or not the proportion of red beads in the sack has changed.

She takes a random sample of 75 beads and finds 4 red beads.

- (d) Stating your hypotheses clearly, use a 5% significance level to carry out a suitable test for the teacher.

(4)

- (e) Find the  $p$ -value in this case.

(1)