

12 In this question you must show detailed reasoning.

A 5-sided spinner can give scores of 1, 2, 3, 4 or 5. After observing a large number of spins, Elaine models the probability distribution of X , the score on the spinner, as shown in Fig. 12.

x	1	2	3	4	5
$P(X = x)$	0.2	0.3	p	p	q

Fig. 12

When the spinner is spun twice, the probability of obtaining a total score of 9 is 0.06.

(a) Given that $q < 2p$, determine the values of p and q . **[6]**

(b) The spinner is spun 10 times. Calculate the probability that exactly one 5 is obtained. **[2]**

Elaine's teacher believes that the probability that the spinner shows a 1 is greater than 0.2. The spinner is spun 100 times and gives a score of 1 on 28 occasions.

(c) Conduct a hypothesis test at the 5% level to determine whether there is any evidence to suggest that the probability of obtaining a score of 1 is greater than 0.2. **[7]**