5. Paula is practising her BMX bike tricks.

Each day she attempts 20 medium tricks and 30 hard tricks.

Every time she attempts

- a medium trick, there is a probability of 0.45 that she successfully completes the trick
- a hard trick, there is a probability of 0.2 that she successfully completes the trick

(a) Find the probability that, on a particular day, she successfully completes

(i) exactly 6 **medium** tricks,

(ii) 12 or more **hard** tricks.

(4)

Each day Paula attempts 10 **easy** tricks.

Every time she attempts an easy trick, there is a probability of p that she successfully completes the trick.

Given that the number of times Paula successfully completes an easy trick each day has a standard deviation of 1.5

(b) find the two possible values for the mean number of times she successfully completes an easy trick each day.

(5)

(c) Using your answer to part (b), suggest the more likely value for the mean number of times Paula successfully completes an easy trick each day.
Give a reason for your answer.

(2)

Paula buys a new BMX bike and believes that this has increased the probability that she completes a **hard** trick successfully.

On a particular day Paula attempted 30 hard tricks and found that she completed 10 tricks successfully.

(d) Test, at the 5% level of significance, whether there is significant evidence to support Paula's belief.
State your hypotheses clearly.

(5)

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Question 5 continued

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Question 5 continued

(Total for Question 5 is 16 marks)