

**2018 Year 10 math topic test: Probability** © itute 2018

Q1 Answer the following probability questions.

- a. What is the probability that a baby is born on a Thursday? 1 mark
- b. 100 raffle tickets are to be sold in a fundraising event. What is the probability that a holder of two tickets will win the second prize? 1 mark
- c. A bag contains a 5-cent coin, a 10-cent coin, a 20-cent coin, a 50-cent coin, a dollar coin and a 2-dollar coin. A coin is randomly taken out of the bag. What is the probability that it is worth more than 30 cents? 1 mark
- d. Two unbiased coins are tossed. One side of each coin is head and the other side is tail. What is the probability that a tail and a head occur? 1 mark
- e. Five letters are placed in seven letterboxes so that a letterbox has at most one letter. What is the probability that a letterbox does not have a letter? 1 mark
- f. Two fair dice are rolled. The six faces on each die are numbered 1, 2, 3, 4, 5 and 6. What is the probability that the sum of the two numbers occurred is 4? 1 mark
- g. One of three closed boxes has a coin in it. You are allowed to open one box at a time until you find the coin. What is the probability of finding the coin in the last box? Show working/explanation. 2 marks



Q2 A probability experiment involves tossing an unbiased coin (one side is head H and the other side is tail T) and then rolling a fair die (numbered 1, 2, 3, 4, 5 and 6 on the six faces).

- a. Write down a possible outcome of the probability experiment. 1 mark
- b. Write down the number of members in the sample space of the probability experiment. 1 mark
- c. Draw a tree diagram in finding the possible outcomes of the probability experiment. 2 marks
- d. Event A has outcomes with an odd number greater than 2. List the possible outcomes in A . 1 mark
- e. Event B has outcomes with a number greater than 2 but less than 5. List the possible outcomes in B . 1 mark
- f. List the outcomes in $A \cap B$. 1 mark
- g. List the outcomes in $A \cup B$. 1 mark



- h. List the outcomes in $(A \cup B)'$. 1 mark
- i. Calculate the probability of B' . 1 mark
- j. Calculate the probability of $A \cap B$. 1 mark
- k. Calculate the probability of $A \cup B$. 1 mark
- l. Determine whether events A and B are independent. Explain. 2 marks
- m. Determine whether events A and B are mutually exclusive. Explain. 2 marks
- n. Given that head H occurred, calculate the probability of A' . 2 marks
- o. Calculate $\Pr(B|A)$. 2 marks



Q3 A bag contains 4 blue marbles, 5 yellow marbles and 6 red marbles. Two marbles are drawn from the bag in succession and placed on a table one after another in a row.

- a. Write down a possible outcome of the probability experiment. 1 mark
- b. Write down the number of members in the sample space of the probability experiment. 1 mark
- c. Draw a tree diagram in finding the possible outcomes of the probability experiment. Write down the conditional probability next to each branch. 3 marks
- d. Event C has outcomes without red marbles. List the possible outcomes in C . 1 mark
- e. Event D has outcomes with marbles of different colours. List the possible outcomes in D . 1 mark
- f. List the outcomes in $C \cap D$. 1 mark
- g. List the outcomes in $D \cup C$. 1 mark
- h. List the outcomes in $(C \cap D)'$. 1 mark



- i. Calculate the probability of D' . 1 mark
- j. Calculate the probability of $C \cap D$. 1 mark
- k. Calculate the probability of $D' \cup C'$. 2 marks
- l. Determine whether events C and D are independent. Explain. 2 marks
- m. Determine whether events C and D are mutually exclusive. Explain. 2 marks
- n. Given that at least one of the two drawn marbles is red, calculate the probability of D . 2 marks
- o. Calculate $\Pr(D|C)$. 2 marks