

## Section I — Multiple choice

1 The frequency of an event is 5 and the total number of frequencies is 40. What is the relative frequency?

- A 0.125                      B 0.05                      C 0.80                      D 0.875
- .....

2 A student is selected from a class of 13 girls and 11 boys. How many possible results?

- A 1                      B 11                      C 13                      D 24
- .....

3 How many elements are there in the sample space when a die is rolled?

- A 1                      B 6                      C {1, 2, 3, 4, 5, 6}                      D Unknown
- .....

4 A number is selected at random from the numbers 1 to 40. What is the probability that the number is 20?

- A 0.025                      B 0.20                      C 0.40                      D 0.50
- .....

5 One card is selected from cards labelled 11, 12, 13, 14, 15, 16, 17 and 18. What is the probability of an odd number and a number divisible by 3?

- A 12.5%                      B 50%                      C 75%                      D 100%
- .....

6 A bag contains red, blue and yellow balls. The probability of selecting a red ball is  $\frac{1}{5}$  and a blue ball is  $\frac{4}{10}$ .  
What is the probability of selecting a yellow ball?

- A 0.3                      B 0.4                      C 0.5                      D 0.6
- .....

7 A letter is chosen at random from the word 'PICTON'. What is the probability that the letter will *not* be a consonant?

- A  $\frac{1}{6}$                       B  $\frac{1}{3}$                       C  $\frac{2}{3}$                       D  $\frac{5}{6}$
- .....

8 What is the complement of an event if the event has a probability of 0.25?

- A 0.25                      B 0.75                      C 1                      D Unknown
- .....

# Topic Test 9

# Relative frequency and probability

## Section II — Short answer

1 James shuffled a normal deck of cards and selected a card, noting whether it was a picture or not a picture card. He obtained 11 picture cards when the procedure was repeated 45 times. What is the relative frequency of a picture card? (Answer as a percentage correct to the nearest whole number.)

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2 Andrew tosses a coin and rolls a die.

- a Use a tree diagram to list the sample space.
- b Verify the total number of outcomes using the fundamental counting principle.

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3 Thirty cards are numbered from 1 to 30. Find the probability of the following outcomes:

- a odd number.
- b divisible by 7.
- c divisible by both 2 and 3.

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4 The black cards are taken from a standard deck of cards and placed face down on a table. One card is selected at random. What is the probability of selecting:

- a a spade?
- b a black ace?
- c a jack, queen or king?

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5 A coin is tossed two times. The probability of throwing two heads is 0.25 and one head is 0.50. What is the probability of the following outcomes?

- a No heads.
- b One or two heads.
- c No tails.

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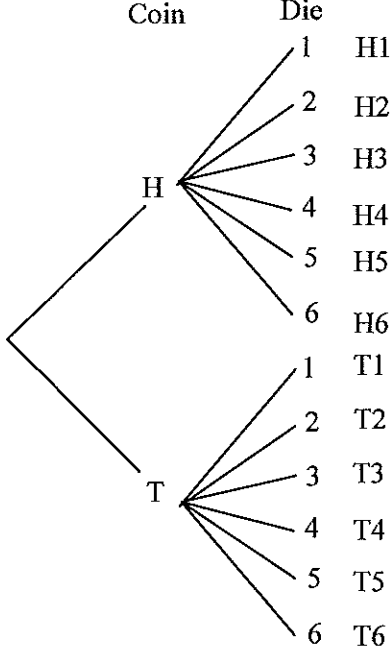
6 The probability of selecting a blue card from 24 cards is given as  $P(\text{Blue}) = \frac{5}{12}$ . What is the probability of not selecting a blue card?

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## Topic Test 9 Relative frequency and probability

### Worked solutions

Section 1	Solution	Answer
1	$\text{Relative frequency} = \frac{5}{40}$ $= 0.125$	A
2	$\text{Number of choices} = 13 + 11$ $= 24$	D
3	$\{1, 2, 3, 4, 5, 6\}$ There are 6 elements in the sample space	B
4	$P(20) = \frac{1}{40}$ $= 0.025$	A
5	Divisible by 3 is $\{12, 15, 18\}$ $P(E) = \frac{1}{8} = 12.5\%$	A
6	$P(\text{Yellow}) = 1 - \frac{1}{5} - \frac{4}{10}$ $= 0.4$	B
7	Not a consonant is $\{I, O\}$ $P(E) = \frac{2}{6} = \frac{1}{3}$	B
8	$P(\bar{E}) = 1 - P(E)$ $= 1 - 0.25$ $= 0.75$	B

Section II	Solution
1	Relative frequency = $\frac{11}{45}$ $\approx 24\%$
2a	
b	Number of arrangements = $2 \times 6 = 12$
3a	$P(E) = \frac{15}{30} = \frac{1}{2}$
b	$P(E) = \frac{4}{30} = \frac{2}{15}$
c	$P(E) = \frac{5}{30} = \frac{1}{6}$
4a	$P(\text{spade}) = \frac{13}{26} = \frac{1}{2}$
b	$P(\text{spade}) = \frac{2}{26} = \frac{1}{13}$
c	$P(\text{spade}) = \frac{6}{26} = \frac{3}{13}$
5a	$P(TT) = 0.25$
b	$P(\text{TH or HT or HH}) = 0.75$
c	$P(HH) = 0.25$
6	$P(\bar{E}) = 1 - P(E)$ $= 1 - \frac{5}{12} = \frac{7}{12}$