



KS3.M-P2 Probability Scale and Simple Events

AQA KS3.M-P2 · Calculators not allowed · about 50 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Write each probability as a fraction, a decimal and a percentage.
- (a) A coin is flipped. The probability of getting heads is $\frac{1}{2}$. Write this as a decimal and a percentage. (1)
- (b) A bag contains 1 red and 3 blue counters. The probability of drawing red is $\frac{1}{4}$. Write this as a decimal and a percentage. (1)
- (c) The probability of a particular student being chosen is 0.2. Write this as a fraction and a percentage. (1)
- (d) A spinner has 5 equal sections. The probability of landing on a green section is $\frac{2}{5}$. Write this as a decimal and a percentage. (1)
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- 2** On a probability scale from 0 to 1, place these events at the correct point and state whether they are impossible, unlikely, even chance, likely or certain: a) rolling a 7 on a fair six-sided die, b) choosing a blue marble from a bag with 2 blue and 1 red marble.
- (a) Rolling a 7 on a fair six-sided die. (1)
- (b) Choosing a blue marble from a bag with 2 blue and 1 red marble. (1)

- 3** A bag contains 3 red, 2 green and 5 yellow counters. What is the probability of drawing a yellow counter? Give your answer as a fraction in simplest form, a decimal and a percentage.

(2)

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- 4** A card is chosen at random from a small pack showing only numbers 1 to 8. What is the probability the number is even? Give your answer as a fraction and decimal.

(2)

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- 5** Write these probabilities in order from least likely to most likely: 0.05, $\frac{1}{10}$, 10%, 0.2

(2)

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- 6** A spinner has 8 equal sections. 3 are blue and 5 are white. What is the probability of landing on white? Give your answer as a fraction in simplest form and as a percentage.

(2)

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- 7** A class has 10 pupils. Two are called Priya, three called Noah, and five called other names. A name is picked at random. What is the probability the name is not Priya? Give your answer as a fraction and decimal.

(2)

8 A fair six-sided die is rolled once. Use the probability scale to label whether each outcome likelihood is impossible, unlikely, even chance, likely or certain, for: a) roll a 6, b) roll an even number, c) roll a 0.

(a) Roll a 6. (1)

(b) Roll an even number. (1)

(c) Roll a 0. (1)

9 A bag contains 4 blue, 1 red and 5 green counters. A counter is chosen at random. What is the probability it is blue or red? Give your answer as a fraction.

(2)

10 Sam spins a spinner with 10 equal parts labelled 1 to 10. What is the probability of spinning a number less than 4? Give your answer as a fraction and decimal.

(2)

11 A fair coin is tossed three times. What is the probability of getting exactly one head? Give your answer as a fraction.

(2)

- 12** A family has two children. Assuming boys and girls are equally likely, what is the probability that both children are girls? Give your answer as a fraction and percentage.

(2)

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- 13** A bag has 6 marbles: 2 white, 2 black and 2 red. A marble is taken at random and then replaced before taking another. What is the probability of drawing white then red in that order? Give your answer as a fraction.

(2)

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- 14** A bag contains 3 purple and 7 orange sweets. One sweet is taken at random. What is the probability it is purple? Then give the probability it is not purple as a fraction.

(2)

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- 15** On a probability scale label the points for probabilities 0, 0.25, 0.5, 0.75 and 1 with the words impossible, unlikely, even chance, likely and certain respectively. Then state which of these is equivalent to $\frac{1}{4}$.

(2)

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- 16** A small pack contains only the cards A, B, C, D. A card is chosen at random. What is the probability of choosing a vowel? (Assume only letters shown.) Then give the probability of choosing a consonant.

(2)

- 17** A fair six-sided die is rolled once and a spinner with 4 equal sections (labelled 1 to 4) is spun once. What is the probability the die shows an even number and the spinner shows 3? Give your answer as a fraction and a decimal.

(3)

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- 18** A bag contains 4 white, 3 black and 3 blue counters. Two counters are drawn one after the other without replacement. Work out the probability both are black. Give your answer as a fraction and as a decimal rounded to 3 decimal places.

(3)

Mark scheme · KS3.M-P2 Probability Scale and Simple Events

Question 1

- (a) **B1** 0.5 and 50% cao
- (a) Answer: **0.5, 50%**
- (b) **B1** 0.25 and 25% cao
- (b) Answer: **0.25, 25%**
- (c) **B1** $\frac{1}{5}$ and 20% cao
- (c) Answer: **$\frac{1}{5}$, 20%**
- (d) **B1** 0.4 and 40% cao
- (d) Answer: **0.4, 40%**

Question 2

- (a) **B1** 0 on scale and 'impossible' cao
- (a) Answer: **0; impossible**
- (b) **B1** $\frac{2}{3}$ on scale and 'likely' cao
- (b) Answer: **$\frac{2}{3}$; likely**

Question 3

- **M1** correct fraction $\frac{5}{10}$ or equivalent used
- **A1** $\frac{1}{2}$, 0.5, 50% cao
- Answer: **$\frac{1}{2}$, 0.5, 50% (for yellow)**

Question 4

- **M1** counting evens 2,4,6,8 gives $\frac{4}{8}$ or equivalent
- **A1** $\frac{1}{2}$ and 0.5 cao
- Answer: **$\frac{1}{2}$, 0.5**

Question 5

- **M1** convert to common form or compare decimals
- **A1** correct order: 0.05, $\frac{1}{10}$, 10%, 0.2 cao
- Answer: **0.05, $\frac{1}{10}$, 10%, 0.2**

Question 6

- **M1** fraction $\frac{5}{8}$ identified
- **A1** $\frac{5}{8}$ and 62.5% cao
- Answer: **$\frac{5}{8}$, 62.5%**

Question 7

- **M1** use complement: $1 - \frac{2}{10}$ or count $\frac{8}{10}$
- **A1** $\frac{4}{5}$ and 0.8 cao
- Answer: **$\frac{4}{5}$, 0.8**

Question 8

- (a) **B1** $\frac{1}{6}$ and 'unlikely' or 'less likely than even' accepted
- (a) Answer: **$\frac{1}{6}$; unlikely**
- (b) **B1** $\frac{1}{2}$ and 'even chance' cao
- (b) Answer: **$\frac{1}{2}$; even chance**
- (c) **B1** 0 and 'impossible' cao
- (c) Answer: **0; impossible**

Question 9

- **M1** add favourable outcomes $4+1 = 5$ and divide by total 10
- **A1** $1/2$ cao
- **Answer: $1/2$**

Question 10

- **M1** numbers less than 4 are 1,2,3 so $3/10$
- **A1** $3/10$ and 0.3 cao
- **Answer: $3/10, 0.3$**

Question 11

- **M1** counting method: outcomes with exactly one head are H T T, T H T, T T H giving 3 successes out of 8
- **A1** $3/8$ cao
- **Answer: $3/8$**

Question 12

- **M1** sample space GG, GB, BG, BB gives $1/4$
- **A1** $1/4$ and 25% cao
- **Answer: $1/4, 25\%$**

Question 13

- **M1** probability white = $2/6 = 1/3$ and red = $2/6 = 1/3$ and multiply for independent events
- **A1** $1/9$ cao
- **Answer: $1/9$**

Question 14

- **M1** purple = $3/10$ identified
- **A1** not purple = $7/10$ cao
- **Answer: $3/10; 7/10$**

Question 15

- **M1** correct labels matched to 0, 0.25, 0.5, 0.75, 1
- **A1** $0.25 = 1/4$ cao
- **Answer: 0 impossible; 0.25 unlikely; 0.5 even chance; 0.75 likely; 1 certain. $1/4 = 0.25$**

Question 16

- **M1** identify vowels among A,B,C,D: only A so $1/4$
- **A1** vowel $1/4$; consonant $3/4$ cao
- **Answer: $1/4; 3/4$**

Question 17

- **M1** probability die even = $1/2$ and spinner 3 = $1/4$ identified
- **M1** multiply independent probabilities $1/2 \times 1/4 = 1/8$
- **A1** $1/8$ and 0.125 cao
- **Answer: $1/8, 0.125$**

Question 18

- **M1** first black $3/10$ and then $2/9$ for second identified
- **M1** multiply probabilities: $3/10 \times 2/9 = 6/90 = 1/15$
- **A1** $1/15$ and 0.067 cao rounded to 3 dp
- **Answer: $1/15, 0.067$**