5.8 Mixed Probability Problem Set: Test Pack

Calculators not allowed · about 55 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A bag contains 5 red counters and 3 blue counters. A counter is chosen at random. Write down the probability that the counter is red.

(1)

2 A bag contains 7 beads: 3 gold, 2 silver and 2 copper. One bead is picked at random. Give the probability that the bead is metal-coloured (silver or copper).

(2)

3 A fair 10-sided spinner is numbered 0 to 9. Two independent spins are made. What is the probability that the sum of the two numbers is 10?

(2)

4 A box contains slips labelled A, B, C, D, E. One slip is chosen at random and then replaced. This is repeated three times. Calculate the probability that letter A appears exactly once in the three draws.

(3)

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5 A fair six-sided die is rolled. Given the result is an even number, what is the probability that it is a 6?

(3)

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6 Stretch question. A game uses two fair coins and one six-sided die. A player wins the prize if they get at least two heads from the two coins and roll a number greater than 4 on the die. Find the probability of winning.

(4)

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7 40 cards are numbered 1 to 40. One card is chosen at random. Work out the probability that the number on the card is a multiple of 4. Give your answer as a fraction in its simplest form.

(2)

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8 The probability that a seed grows into a plant is 1/5. Sam plants 50 seeds. How many plants should he expect?

(2)

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9 In a class of 42 pupils, 18 play football, 20 play hockey and 3 play both football and hockey.
How many pupils play football only?

(2)

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10 The probability that it rains on a given day is 1/4. Estimate the number of days with rain in a period of 300 days.

(2)

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11 30 cards are numbered 1 to 30. One card is chosen at random. Work out the probability that the number on the card is a multiple of 5. Give your answer as a fraction in its simplest form.

(2)

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12 A coin is flipped twice. List all possible outcomes and find the probability of getting exactly one head.

(3)

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13 A coin is thrown 80 times and lands on heads 49 times. Work out the relative frequency of heads as a decimal, and say whether this is close to 0.5.

(2)

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14 In an experiment a drawing pin is dropped 50 times and lands point up 14 times. Use this to estimate how many times it will land point up in 1000 drops.

(3)

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15 69 people were asked about their choice. The two-way table shows the results. Boys: Art 15, Music 5, Drama 18; Girls: Art 14, Music 13, Drama 4.
One of the Boys is chosen at random. Work out the probability that this person chose Art. Give your answer as a fraction in its simplest form.

(2)

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16 15 cards are numbered 1 to 15. One card is chosen at random. Work out the probability that the number on the card is less than 6. Give your answer as a fraction in its simplest form.

(2)

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17 In a class of 32 pupils, 9 play French, 22 play Spanish and 4 play both French and Spanish.
How many pupils play neither French nor Spanish?

(3)

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18 A card is drawn at random from a set of 12 cards numbered 1 to 12. What is the probability the number is a multiple of 3?

(2)

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Mark scheme · 5.8 Mixed Probability Problem Set: Test Pack

Question 1

5/8 cao	B1

Answer: **5/8**

Question 2

recognition silver or copper count = 4 out of 7	M1
4/7 cao	A1

Answer: **4/7**

Question 3

count pairs (0,10) invalid so valid ordered pairs are (1,9),(2,8),(3,7),(4,6),(5,5),(6,4),(7,3),(8,2),(9,1) = 9 pairs out of 100	M1
9/100 cao	A1

Answer: **9/100**

Question 4

probability of A on one draw = 1/5 and not A = 4/5 used and recognition of binomial count 3 positions	M1
compute $3*(1/5)*(4/5)^2$	M1
3*(1/5)*(16/25) = 48/125 cao	A1

Answer: **48/125**

Question 5

recognition conditional sample space of even numbers {2,4,6} size 3	M1
favourable outcome 6 is one of these	M1
1/3 cao	A1

Answer: **1/3**

Question 6

calculate probability of at least two heads from two coins: outcomes HH, HT, TH, TT so P(at least two heads)=P(HH)=1/4	M1
calculate probability die > 4: favourable 5 or 6 gives 2/6 = 1/3	M1
recognition of independence and multiplication of probabilities	M1
(1/4)*(1/3) = 1/12 cao	A1

Answer: **1/12**

Question 7

10 favourable outcomes out of 40	M1
1/4 cao	A1

Answer: **1/4**

Question 8

1/5 x 50	M1
10 cao	A1

Answer: **10**

Question 9

18 - 3	M1
15 cao	A1

Answer: **15**

Question 10

1/4 x 300	M1
75 cao	A1

Answer: **75**

Question 11

6 favourable outcomes out of 30	M1
1/5 cao	A1

Answer: **1/5**

Question 12

correct list of outcomes: HH, HT, TH, TT or equivalent	M1
identification of favourable outcomes HT and TH	M1
2/4 = 1/2 cao	A1

Answer: **1/2**

Question 13

49/80	M1
0.6125 and a correct comparison	A1

Answer: **0.6125; not close to 0.5**

Question 14

relative frequency 7/25	M1
7/25 x 1000	M1
280 cao	A1

Answer: **280**

Question 15

total for Boys = 38	M1
15/38 cao	A1

Answer: **15/38**

Question 16

5 favourable outcomes out of 15	M1
1/3 cao	A1

Answer: **1/3**

Question 17

9 + 22 - 4 = 27	M1
32 - 27	M1
5 cao	A1

Answer: **5**

Question 18

identification of multiples of 3: 3,6,9,12 gives 4 favourable out of 12	M1
4/12 = 1/3 cao	A1

Answer: **1/3**

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