Higher tier unit 10-1 check in test

Calculator

Q1.   Karen throws a nine-sided dice.
      The sides of the dice are numbered from 1 to 9.
      What is the probability that Karen throws an odd number?

Q2.   There are 160 students at a disco.
      96 of the students are female.
      Write as a fraction the probability that a student picked at random is male.

Q3.   Jane has a packet of seeds.
      The probability that a seed will grow is 0.75
      What is the probability that a seed will **not** grow?

Q4.   Rhiana plays a game.
      The probability that she will lose the game is 32%.
      The probability that she will draw the game is 5%.

      What is the probability that she will win the game?

Q5.   There are 20 sweets in a box.
      x of the sweets are red.
      The rest of the sweets are yellow.

      Tom takes at random a sweet from the box.
      Write down an expression, in terms of x, for the probability that Tom takes a yellow sweet.

Q6.   An electronic game can show red or blue or green or yellow.
      The table shows the probabilities that each colour will be shown.

Colour	red	blue	green	yellow
Probability	0.15	0.2	0.41	0.24

      Janice is going to play the game 50 times.
      Work out an estimate for the number of times the colour shown will be yellow.

Q7. Ali throws a biased dice 200 times.
The table shows information about his results.

Score	Frequency
1	47
2	4
3	25
4	56
5	38
6	30

Charlie throws the dice 550 times.
Work out an estimate for the total number of times that Charlie will get a score of 4

Q8. There are only red counters, blue counters, white counters and black counters in a bag.
The table shows the probability that a counter taken at random from the bag will be
red or blue.

Colour	red	blue	white	black
Probability	0.2	0.5		

The number of white counters in the bag is the same as the number of black counters in
the bag.
There are 240 counters in the bag.

Work out the number of white counters in the bag.

[Q9–10 linked]
Q9. Four friends each throw a coin a number of times.
The table shows the number of heads and the number of tails each friend got.

	Ben	Helen	Paul	Sharif
heads	12	20	43	63
tails	8	30	57	67

The coin is to be thrown one more time.
Which of the four friends' results will give the best estimate for the probability that the coin
will land tails. Justify your answer.

Q10. Four friends each throw a coin a number of times.
The table shows their results.

	Ben	Helen	Paul	Sharif
heads	12	20	43	63
tails	8	30	57	67

Paul says,

"With this coin you are twice as likely to get heads as to get tails."

Is Paul correct?
Justify your answer.

Topics listed in objectives

- Write probabilities using fractions, percentages or decimals;
- Understand and use experimental and theoretical measures of probability, including relative frequency to include outcomes using dice, spinners, coins, etc;
- Estimate the number of times an event will occur, given the probability and the number of trials;
- List all outcomes for single events systematically;
- Know that the sum of the probabilities of all outcomes is 1;
- Use $1 - p$ as the probability of an event not occurring where p is the probability of the event occurring;
- Compare experimental data and theoretical probabilities;
- Compare relative frequencies from samples of different sizes.

Answers

Q1. $\dfrac{5}{9}$

Q2. $\dfrac{2}{5}$

Q3. 0.25

Q4. 63%

Q5. $\dfrac{20 \quad x}{20}$

Q6. 12

Q7. 154

Q8. 36

Q9. Sharif's, because he made the greatest number of throws.

Q10. Correct for Paul, but not for the others.

Higher tier unit 10-2 check in test

Calculator

Q1.   Denzil has a 4-sided spinner.
       The sides of the spinner are numbered 1, 2, 3 and 4.
       The spinner is biased.

       The table shows each of the probabilities that the spinner will land on 1, on 3 and on 4.
       The probability that the spinner will land on 3 is *x*.

Number	1	2	3	4
Probability	0.3		*x*	0.1

       Find an expression, in terms of *x*, for the probability that the spinner will land on 2.
       Give your answer in its simplest form.

Q2.   Josh plays a game with two sets of cards.

       Set A | 1 | 2 | 4 | 5 | 7 |

       Set B | 3 | 6 | 8 | 9 |
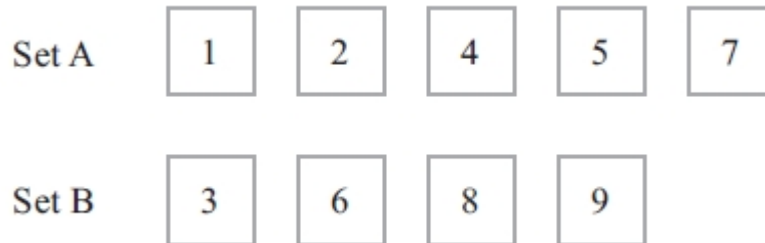
       Josh takes at random one card from each set.
       He adds the numbers on the two cards to get the total score.
       Copy and complete the table to show all the possible total scores.
       Use the table to find the probability that Josh's total score will be greater than 12.

                         Set A

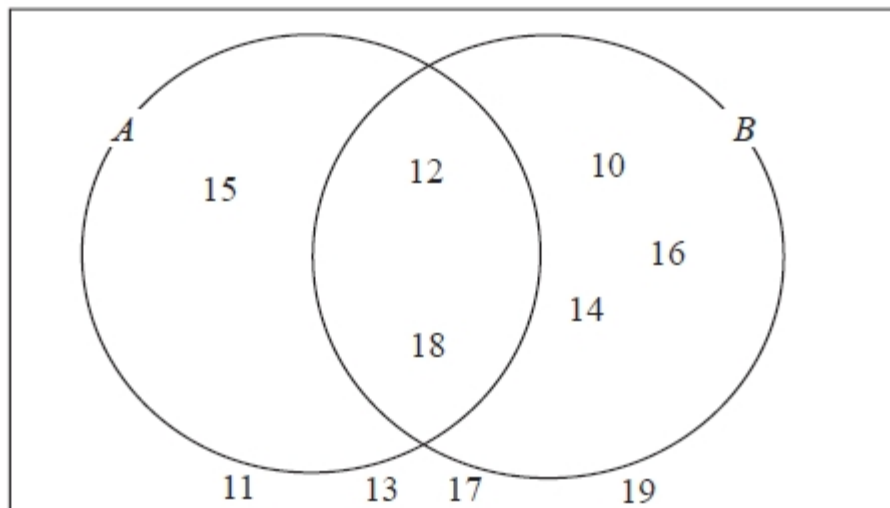|		1	2	4	5	7
	3	4	5	7	8	10
Set B	6	7	8	10		
	8					
	9					

Q3. The two-way table shows some information about how some men and some women travelled to work yesterday.

	Train	Car	Bus	Total
Men	12		6	28
Women		4		
Total			13	50

A person is chosen at random.
Given that the person is a woman, work out that the probability that she travelled to work by bus yesterday.

Q4. Here is a Venn diagram.

Which numbers are in set $A \cup B$?

Q5.   Isobel plays a game against Eric.

Isobel is twice as likely as Eric to win the game.
The probability that the game is drawn is 0.1

Work out the probability that Eric wins at least one of the three games.

Q6.   There are 80 students at a language school.
All 80 students speak at least one language from French, German and Spanish.

9 of the students speak French, German and Spanish.
19 of the students speak French and German.
28 of the students speak French and Spanish.
17 of the students speak Spanish and German.
45 students speak French.
50 students speak Spanish.

Draw a Venn diagram to show this information.

One of the 80 students is selected at random.
Given that the student speaks German, find the probability that this student also speaks French.

Q7. There are 8 counters in a box.
The letter A is on 6 of the counters.
The letter B is on the other 2 counters.

Sally takes at random a counter from the box.
She keeps the counter.
Then Tina takes at random a counter from the box.

Copy and complete the probability tree diagram.
Use it to work out the probability that both Sally and Tina take a counter with the letter A on it.

Sally   Tina

$\frac{6}{8}$ A

.... B
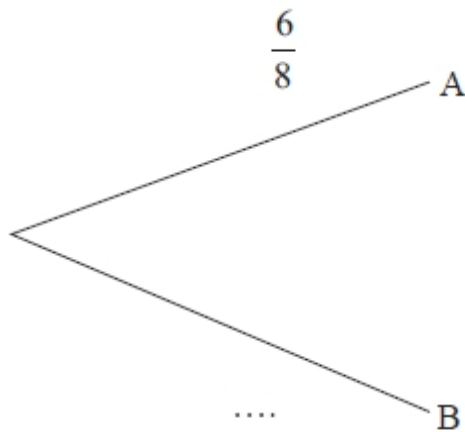
Q8. There are 11 girls and 8 boys in a tennis club.
Jake is going to pick at random a team from the tennis club.
The team will have two players.
Work out the probability that Jake will pick two boys or two girls for the team.

Q9. Thelma spins a biased coin twice.
     The probability that it will come down heads both times is 0.09.

     Calculate the probability that it will come down tails both times.

Q10. Paul has 8 cards.
     There is a number on each card.

| 2 | 3 | 3 | 4 | 5 | 5 | 5 | 5 |

     Paul takes at random 3 of the cards.
     He adds together the 3 numbers on the cards to get a total *T*.

     Work out the probability that *T* is an odd number.

Topics listed in objectives

- Write probabilities using fractions, percentages or decimals;
- Find the probability of successive events, such as several throws of a single dice;
- List all outcomes for combined events, systematically;
- Draw sample space diagrams and use them for adding simple probabilities;
- Use $1 - p$ as the probability of an event not occurring where p is the probability of the event occurring;
- Work out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/values;
- Use union and intersection notation;
- Find a missing probability from a list or two-way table, including algebraic terms;
- Understand conditional probabilities and decide if two events are independent;
- Draw a probability tree diagram based on given information, and use this to find probability and expected number of outcome;
- Understand selection with or without replacement;
- Calculate the probability of independent and dependent combined events;
- Use a two-way table to calculate conditional probability;
- Use a tree diagram to calculate conditional probability;
- Use a Venn diagram to calculate conditional probability;

Answers

Q1. $0.6 - x$

Q2. $\dfrac{3}{10}$

Q3. $\dfrac{7}{22}$

Q4.   10, 12, 14, 15, 16, 18

Q5.   0.657

Q6. $\dfrac{19}{40}$

Q7. $\dfrac{30}{56}$

Q8. $\dfrac{83}{171}$

Q9.   0.49

Q10. $\dfrac{156}{336}$