Name:	Teacher Assessment		

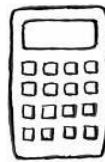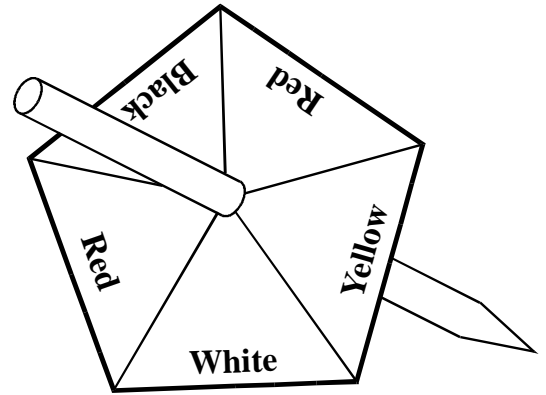**Section A**   **Probability Scale**   **Grade G → E**

1. A fair spinner has five sections.
Two sections are red, one is white, one is black and one is yellow.
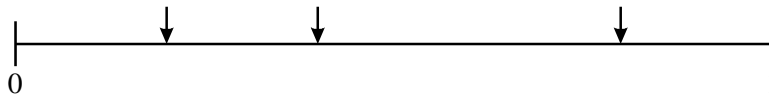
The spinner is spun once.

Black Red
Red Yellow
White

(a) Which colour is the spinner most likely to land on?

Answer ....

(1)

(b) The probabilities of three events have been marked on the probability scale below.

A: The spinner lands on red.
B: The spinner lands on white.
C: The spinner does **not** land on yellow.

0 ————————————————————— 1

Label each arrow with a letter to show which event it represents.

(3)(Total 4 marks)

2. The probabilities of the following events have been marked on the probability scale below.

A: The next baby born at the City Hospital will be a boy.
B: The next vehicle to pass the hospital will be a car.
C: The next vehicle to pass the hospital will have no people in it.

0 ————————————————————— 1
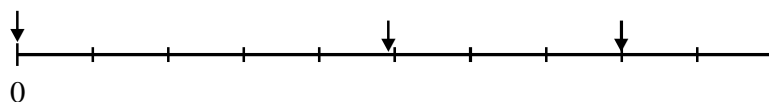
Label each arrow with a letter to show which event it represents.

(Total 2 marks)

3. The boxes show some events.Write one of the following words below each box to describe the chance of the event happening.

IMPOSSIBLE   UNLIKELY   EVENS   LIKELY   CERTAIN

A person living to the age of 100 years	An ordinary six-sided dice landing on a number less than 7	There will be eight Sundays next month

....

4. A fair six-sided dice is thrown once.

Mark the probability of each of the following events onto the probability scale.

A: The dice lands on the number 3.

B: The dice lands on an odd number.

C: The dice lands on a number greater than 2.

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├────┼────┼────┼────┼────┼────┤
0                              1
```
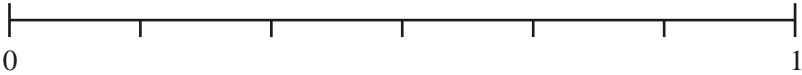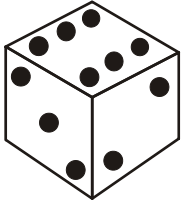
(Total 3 marks)

5. A fair spinner has three equal sections. One section is red, one is blue and one is yellow.

The spinner is spun once.
The probabilities of three events have been marked on the probability scale below.

 A: The spinner lands on blue.

 B: The spinner lands on green.

 C: The spinner does **not** land on red.

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↓           ↓           ↓
├───────────────────────────────┤
0                                1
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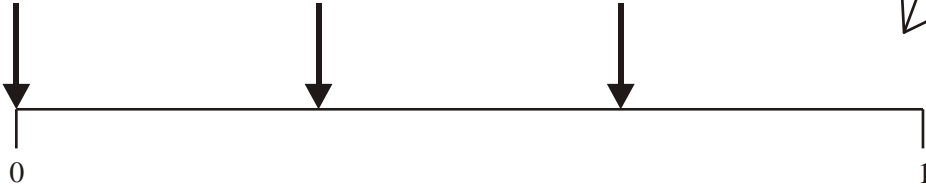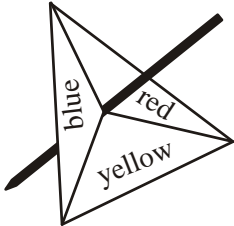
Label each arrow with the letter to show which event it represents.

(Total 3 marks)

6. A fair six-sided spinner is numbered from 1 to 6.

The spinner is spun once.
Mark on the probability scale the probabilities of each of the following events.

 A The spinner lands on an even number.

 B The spinner lands on a 4 or a 5.

 C The spinner lands on a number less than 7.

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├────┼────┼────┼────┼────┼────┤
0                              1
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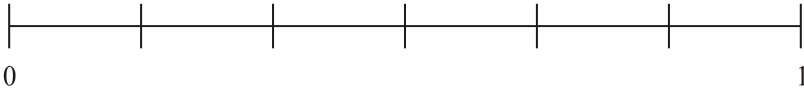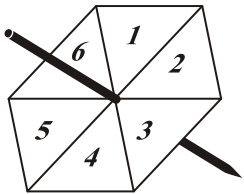
(Total 3 marks)

Success:

Target:
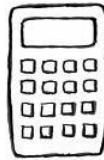
Section B   Calculating Probabilities   Grade F → D

1.   This passage is from a reading book for Primary children.

> Horatio was gazing into the night from his bedroom
> window. He was watching for aliens.

(a)   Complete this frequency table by counting the number of letters in each word in
the passage.

Number of letters in each word	Tally	Frequency
1		
2		
3		
4		
5		
6		
7		
8		
Total		

(3)

(b)   Write down the mode of the number of letters in a word.

Answer ....

(1)

(c)   A word is chosen at random from the passage. Find the probability that the word has

(i)   exactly four letters,

Answer ....

(1)

(ii)   more than five letters.

Answer ....

(2)

(d)   What do you think would happen to the average word length if a similar passage was
chosen from an adult science fiction novel?

....

....

(1)(Total 8 marks)

2. These are the members of a girls' basketball team.

One girl is to be chosen at random to be captain.

What is the probability that her name begins with J?
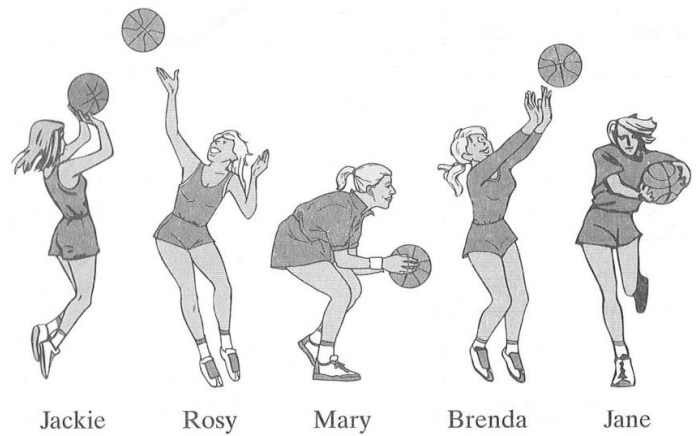
Jackie   Rosy   Mary   Brenda   Jane

…………...........…...........……..……................……………………………………

Answer …………………………………

(Total 2 marks)

3. Sami keeps her credit card receipts in a drawer until her statement arrives.
The table shows the number of each type of receipt in the drawer.

Petrol	Groceries	Hotels	Rail fares	Other
5	8	1	2	4

Sami picks a receipt at random from the drawer.
What is the probability that the receipt she picks is

(a)   for hotels,

Answer ……………………………………

(2)

(b)   **not** for hotels?

Answer ……………………………………

(1)
(Total 3 marks)

4.   (a)   The list gives some words used in probability.

Impossible   unlikely   evens   likely   certain

For each of the events below, write down the word from the list which describes its probability.

(i)   A fair coin landing on heads.

Answer ....

(1)

(ii)   Picking a red ball, at random, from a bag containing 20 red balls and 3 black balls.

Answer ....

(1)

(iii)   Throwing the number 8 on an ordinary fair six-sided dice.

Answer ....

(1)

(b)   Brian has some red marbles, blue marbles and white marbles in a bag.
He says that the probability of choosing each colour is shown in the table.

Colour of marble	red	blue	white
Probability	0.3	0.6	0.2

There is a mistake in the probabilities in the table. Explain how you know this.

....

(1)

(Total 4 marks)

5.   A fair ordinary six-sided dice is thrown once. The boxes show some of the possible outcomes.

Draw a line from each box in column A to the box in column B which has the same probability.

Column A   **Column B**

| Throwing a six | | Throwing an even number |

| Throwing a two or a three | | Throwing a one |

| Throwing an odd number | | Throwing a four or a five |

(Total 3 marks)

6.   Susan and Jill play a game.

(a)   Susan has a box containing 3 red, 4 yellow and 2 blue counters. She picks a counter at
random. What is the probability that Susan picks a yellow counter?

Answer ....

(2)

(b)   Jill has a box containing 18 counters of which 8 are yellow. She picks a counter at
random. What is the probability that Jill does **not** pick a yellow counter?

Answer ....

(2)

(c)   Who is more likely to pick a yellow counter? Tick the correct box. Explain your answer.

☐   ☐   ☐

Susan   Jill   Neither

Explanation ....

....

(2)(Total 6 marks)

7. (a) A box of chocolates contains 7 soft centres, 5 toffee centres and 8 nut centres. Mary chooses a chocolate at random.

What is the probability that she chooses a chocolate with a toffee centre?

....

....

Answer ....

(2)

(b) In a bag of sweets the probability of choosing a sweet with a soft centre is 0.4
What is the probability of choosing a sweet that does **not** have a soft centre?

....

Answer ....

(1)
(Total 3 marks)

8. A bag contains 12 blue and 8 green counters. A counter is chosen at random.

(a) Find the probability that the counter chosen is red.

....

....

Answer ....

(1)

(b) Find the probability that the counter chosen is green.
Give your answer as a fraction in its lowest terms.

....

....

Answer ....

(2)

(c) 10 yellow counters are added to the bag.

Calculate the probability that a counter chosen at random is green or yellow.

....

....

....

....

Answer ....

(2)
(Total 5 marks)

9. In a raffle 200 tickets are sold. There is only one prize.
Mr Key buys 10 tickets.
Mrs Key buys 6 tickets.
Their children, Robert and Rachel, buy 2 tickets each.

(a) Which member of the family has the best chance of winning the prize?
Give a reason for your answer.

....

....

(2)

(b) What is the probability that Mrs Key wins the prize?

....

Answer ....

(2)

(c) What is the probability that **none** of the family wins the prize?

....

....

Answer ....

(3)
(Total 7 marks)

10. A bag contains blue, red and green cards only.
One card is taken at random from the bag.
The table shows the probabilities of taking a blue card and a red card.

Colour	Blue	Red	Green
Probability	0.3	0.5	

(a) What is the probability of taking a yellow card from the bag?

Answer ....

(1)

(b) What is the probability of taking a card that is **not** blue from the bag?

....

Answer ....

(1)

(c) Complete the table to show the probability of taking a green card from the bag.

....

(1)
(Total 3 marks)

11. Danny has two fair spinners.

Spinner A has four equal sections, two are red, one is yellow and one is green.
Spinner B has six equal sections, three are red, one is yellow and two are green.
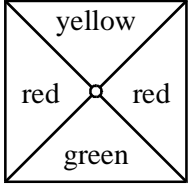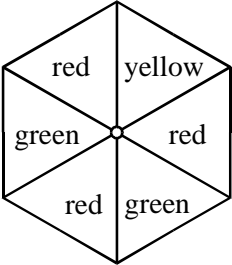
Spinner A   Spinner B

Danny spins each spinner once.

(a) Which colour is Spinner A most likely to land on?

Answer ....

(1)

(b) Which spinner is more likely to land on yellow, Spinner A or Spinner B?

Give a reason for your answer.

...................……………………………………………………………………………

...................……………………………………………………………………………

(1)

(c) What is the probability that Spinner A lands on green?

Answer ....

(1)

(d) The probabilities of three events have been marked on the probability scale below.

R: Spinner B lands on red
Y: Spinner B lands on yellow
G: Spinner B lands on green
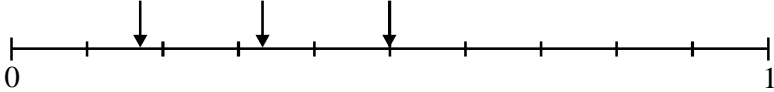
Label each arrow with a letter to show which event it represents.

(2)
(Total 5 marks)

12. (a)   Ann has a spinner which has five equal sections.
Two sections are red, one is yellow, one is green and one is white.
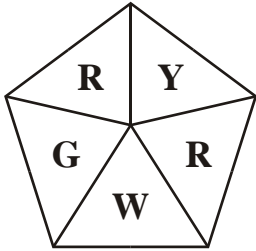
First spinner

Ann spins the spinner once.
On what colour is the spinner most likely to land?

Answer ....

(1)

(b)   Ann has a second spinner which has six equal sections.
Three sections are red, one is yellow and two are blue.
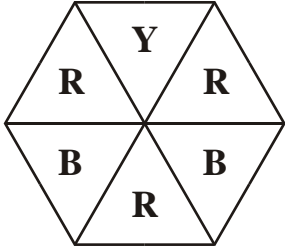
Second spinner

Ann spins this spinner once.
What is the probability that this spinner lands on red?

....…...

Answer ....

(2)

(c)   Ann thinks that she has more chance of getting yellow on the second spinner.
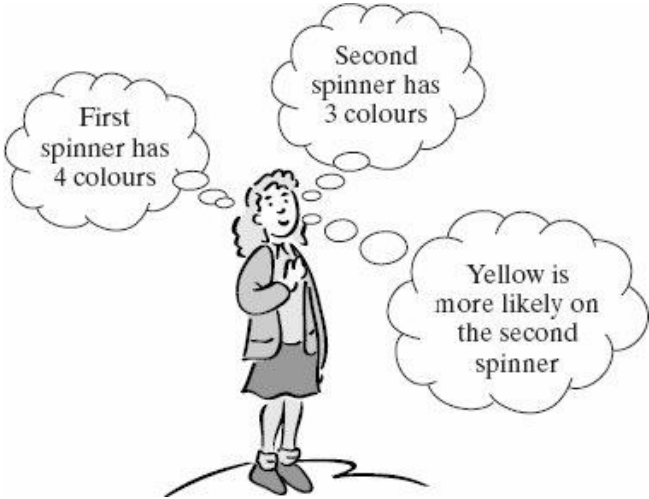
Explain why Ann is wrong.

....

....

....

(2)
(Total 5 marks)

Success:

Target:

Teacher
Assessment
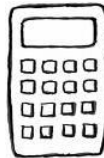
Section C   Listing Outcomes   Grade D

1.   Lucy has two ordinary, fair dice. One dice is red and the other is blue. She rolls each dice once
and adds the scores to get the total.

(a)   Complete the table to show the totals.

(2)

(b)   What is the probability that Lucy gets a
total of 12?

Answer ....

(1)

(c)   What is the probability that Lucy gets a
total of 6?

Answer ....

(2)(Total 5 marks)

Blue dice

		1	2	3	4	5	6
	1						
	2						
Red dice	3						
	4						
	5						
	6						

2.   Two fair spinners A and B are shown.

A

6   5
1   4
1

B

7   6
1   5
2
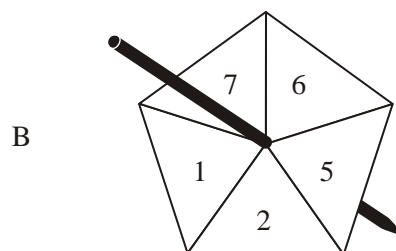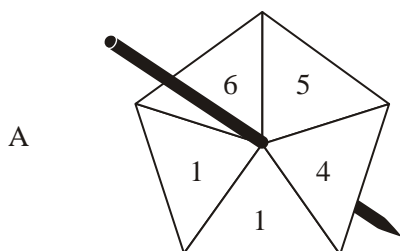
James plays a game using the two spinners.
His score is the sum of the two numbers on spinner A and spinner B.
He wins if his score is even.

James plays the game many times.

Is he likely to win more times than he loses?
You **must** show your working.
You may use this table if you wish.

Spinner A

Spinner B	+	1	1	4	5	6
	1					
	2					
	5					
	6					
	7					

…………………………………………………………………………

……………………………………………………………………………………...

……………………………………………………………………………………...

……………………………………………………………………………………...

(Total 4 marks)

3. Sarah is playing a game with a fair coin and a fair six-sided dice.
She spins the coin and then throws the dice.

If the coin shows heads Sarah's score is 1 **more** than the number shown on the dice. If the coin shows tails Sarah's score is 2 **less** than the number shown on the dice.

(a) Complete the table to show all possible scores.

Dice

		1	2	3	4	5	6
Coin	**Heads**				5		
	Tails	−1					

(2)

(b) Work out the probability that Sarah's score is

(i) negative   Answer ....

(1)

(ii) more than 3.

....

Answer ....

(2)(Total 5 marks)

4. David is playing a game with a fair coin and a set of four cards. The cards are numbered 1, 2, 3 and 4. David spins the coin and then chooses a card at random.

If the coin shows heads David's score is the same as the number on the card.
If the coin shows tails David's score is twice the number on the card.

(a) Complete the table to show all possible scores.

Card

		1	2	3	4
Coin	**Heads**		2		
	Tails			6	

(2)

(b) Work out the probability that David's score is

(i) 3   Answer ....

(1)

(ii) an even number.

....

Answer ....

(2)(Total 5 marks)

5. Ashraf is playing a game with a fair coin and a fair triangular spinner with sections numbered 2, 3 and 4.

He flips the coin and then spins the spinner.

If the coin shows heads, his score is the number on the spinner **multiplied** by 3.
If the coin shows tails, his score is the number on the spinner.

(a) Complete the table to show all the possible scores that Ashraf can get.

		Spinner		
		2	**3**	**4**
Coin	**Heads**			
	Tails			

(2)

(b) Write down the probability that Ashraf gets a score of

(i) 9,   Answer ....

(1)

(ii) 6 or less.   Answer ....

(2)(Total 5 marks)

6. Here is a pack of ten cards.

(a) Complete this two-way table to show the number of different cards in the pack.

	Shaded	**Unshaded**
Circles		
Triangles		

(2)

(b) One of the cards is picked at random.
What is the probability that it has either a shaded circle **or** an unshaded triangle?

....

....

Answer...

(2)(Total 4 marks)

Success:

Target:

Section D   Relative Frequency and Expectation   Grade D / C

1. A dice is suspected of bias. Here are the results of 20 throws.
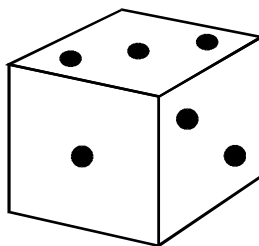
3	4	2	3	1	5	6	2	4	3
4	3	1	1	6	2	5	6	5	3

(a) Use these results to calculate the relative frequency of each score.

....

....

Score	1	2	3	4	5	6
Relative frequency						

(2)

(b) Use the relative frequency to calculate how many times you would expect to score 3 in 60 throws of this dice.

....

....

....

Answer ....

(2)

(c) Compare your answer to part (b) with the number of times you would expect to score 3 in 60 throws of a **fair** dice.

....

....

....

(1)
(Total 5 marks)

2. Twenty pupils each shuffle a pack of coloured cards and choose a card at random. The colour of the card is recorded for each pupil. (R = Red   B = Blue   G = Green   Y = Yellow)

B	Y	Y	G	R
G	R	Y	B	B
Y	R	B	B	Y
B	B	G	R	Y

(a) Use these results to calculate the relative frequency of each colour.

....

Colour	Red	Blue	Green	Yellow
Relative frequency				

(2)

(b) Use the results to calculate how many times you would expect a blue card if 100 pupils each choose a card at random.

....

....

Answer ....

(2)(Total 4 marks)

3. Red, blue, white and green tickets are sold in a raffle.
The table shows some of the probabilities of these tickets winning the first prize.

(a) Calculate the probability of a green ticket winning the first prize.

....

....

....

....

Ticket colour	Probability of winning first prize
Red	0.4
Blue	0.2
White	0.1
Green	

Answer ....

(2)

(b) There were 1000 tickets sold in this raffle. Calculate how many red tickets and blue tickets were sold altogether.

....

....

....

Answer ....

(2)(Total 4 marks)

4. Lynne has a spinner with coloured sections of equal size.
She wants to know the probability that her spinner lands on blue.
She spins it 100 times and calculates the relative frequency of blue after every 10 spins
Her results are shown on the graph.
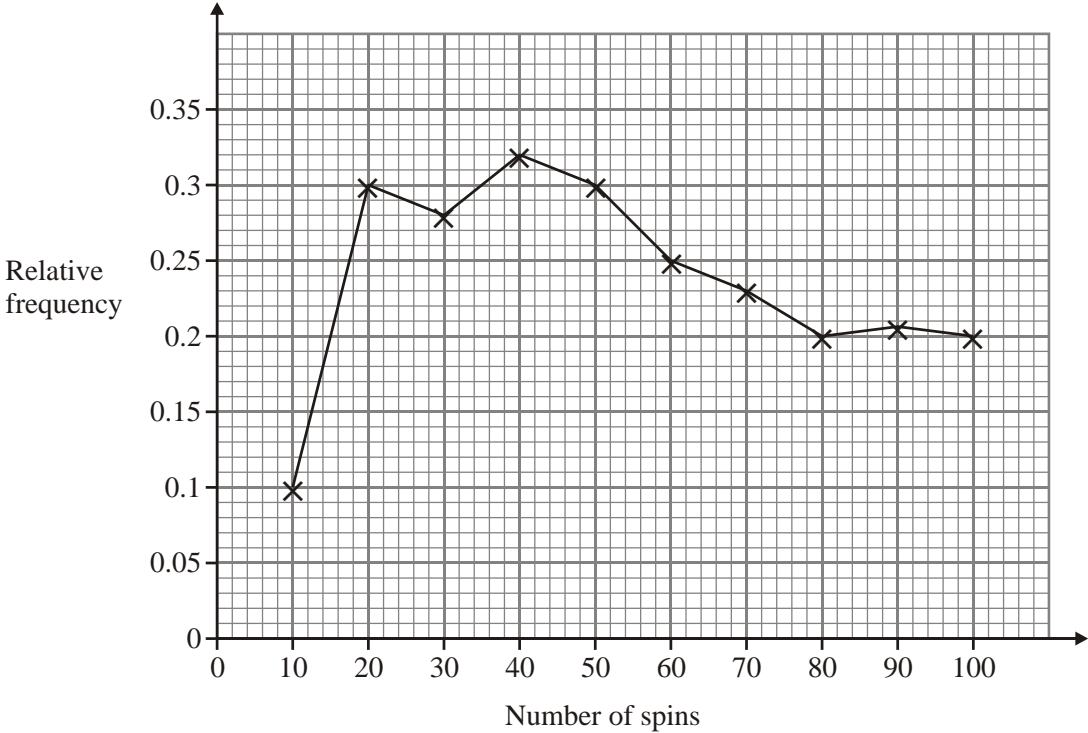
(a) Use the graph to calculate the number of times the spinner landed on blue in the first 20 spins

....

....

Answer ....

(2)

(b) Use the graph to estimate the probability that the spinner will land on blue.

....

Answer ....

(1)
(Total 3 marks)

5. Amy has a bag containing red, green and blue balls.
She wants to know the probability of picking a red ball from the bag.
She picks a ball at random from the bag, records the colour and replaces the ball in the bag.
Amy does this 60 times and calculates the relative frequency of red after every 10 goes.
Her results are shown on the graph.
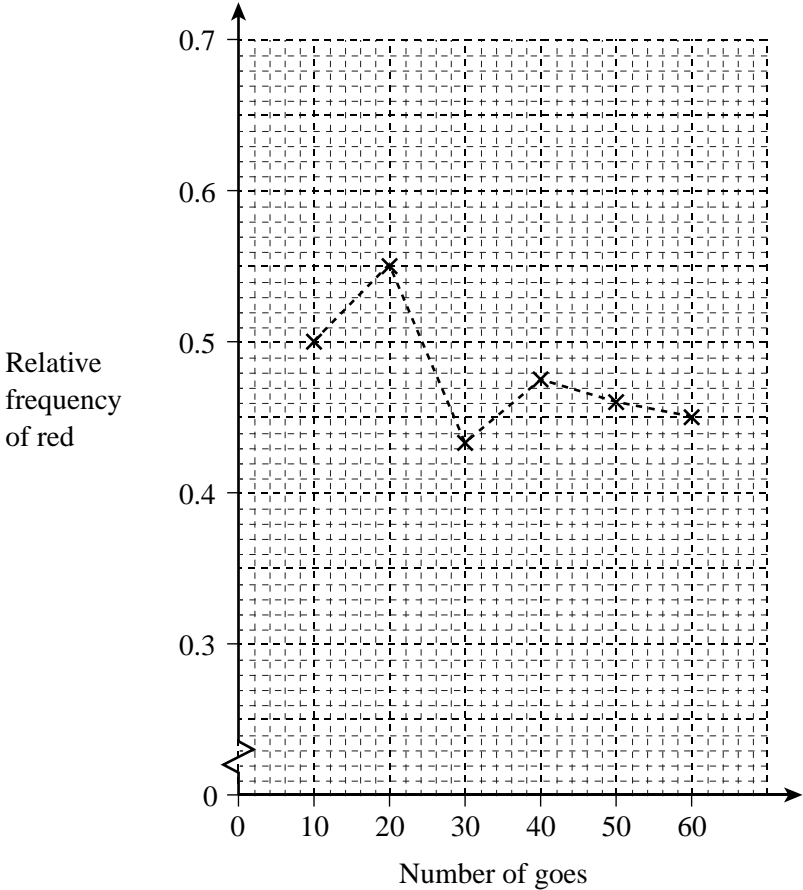
(a) Use the graph to calculate the number of times Amy picked a red ball in the first 10 goes.

……………………………………………………………………………………………….

Answer ……………………………………………………………

(2)

(b) What is the best estimate for the probability of picking a red ball?
Explain your answer.

……………………………………………………………………………………………….

……………………………………………………………………………………………….

……………………………………………………………………………………………….

(2)
(Total 4 marks)

6. A four-sided spinner has sections labelled A,B,C,D.
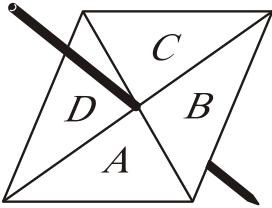
The spinner is spun and the relative frequency of the letter A is recorded after every 10 spins.

(a) After 50 spins there were 20 letters As.
Plot this relative frequency on the diagram.

....

....

(1)
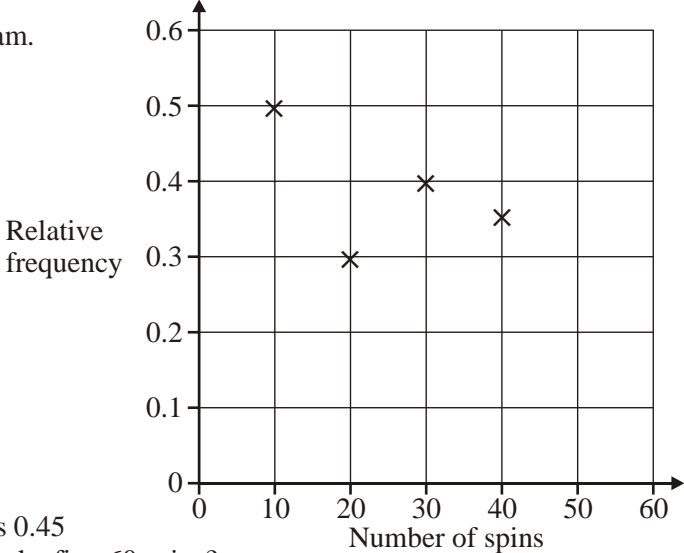
(b) The relative frequency after the first 60 spins is 0.45
How many times does the spinner land on A in the first 60 spins?

....

Answer ....

(1)

(c) Is the spinner biased? Give a reason for your answer.

....

....

(2)

(d) The spinner is spun 1000 times.
How many times would you expect the spinner to land on A?

....

Answer ....

(2)

(e) A different four-sided spinner has these probabilities.

Letter	A	B	C	D
Probability	0.2	0.3	0.4	0.1

What is the probability of getting a B or a C with one spin?

....

....

Answer ....

(2)(Total 8 marks)

7. Alan, Bob and Colin play a game of darts.
There is only one winner.
The probability that Alan wins the game is 0.3
The probability that Bob wins the game is 0.5

(a) What is the probability that Alan or Bob wins the game?

....

....

Answer ....

(1)

(b) Alan, Bob and Colin play 20 games of darts. How many games would you expect Colin to win?

....

....

....

....

....

....

Answer ....

(4)
(Total 5 marks)

8. A bag contains 200 coloured discs.
The discs are either red, blue or yellow.
There are 86 red discs in the bag.
The probability that a blue disc is chosen from the bag is 0.22

Calculate the number of yellow discs in the bag.

....

....

....

....

....

....

....

....

Answer ....

(Total 4 marks)

9. A spinner has a red sector (R) and a yellow sector (Y).
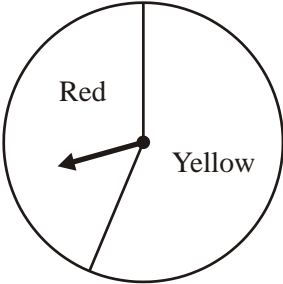
The arrow is spun 1000 times.
The table shows the relative frequency of a red after different numbers of spins.

Number of spins	Relative frequency of a red
50	0.42
100	0.36
200	0.34
500	0.3
1000	0.32

(a) How many times was a red obtained after 200 spins?

....

....

....

Answer...

(2)

(b) Which relative frequency gives the best estimate of the probability of a red?
Explain your answer.

....

....

(2)
(Total 4 marks)

10. Penny, Sam and Robert do this experiment on the **same** bag of **10** counters.

1. Take a counter from the bag at random.

2. Record its colour.

3. Put the counter back in the bag.

Repeat this trial a number of times.

Their results are shown in this table.

Name of pupil	Number of trials	Colour of counter		
		Black	White	Green
Penny	10	0	6	4
Sam	40	3	16	21
Robert	200	22	76	102

Estimate the number of each different coloured counter in the bag.
Clearly state the set of results that you use to make the estimate.
Give a reason for your choice.

....

....

....

....

....

....

....

Set of results used ....

Reason ....

....

Answer   Black ...., White ...., Green …………………….

(Total 4 marks)

Success:

Target: