Relative Frequency - Worksheet

Skill

Group A - Calculating relative frequency

Calculate the relative frequency for the events below, as fractions in their simplest form:

A coin is flipped 50 times, and lands on:

1) Heads 20 times **2)** Tails 30 times **3)** Heads 18 times

A coin is flipped 120 times, and lands on:

4) Tails 35 times **5)** Heads 85 times **6)** Tails 72 times

A dice is rolled 80 times, and scores:

7) three, 17 times **8)** two, 6 times **9)** five, 12 times

A dice is rolled 60 times, and scores:

10) six, 18 times **11)** four, 13 times **12)** one, 14 times

---

Group B - Calculating the total number of experiments given the relative frequency

Work out the total number of experiments given the result and the relative frequency:

1) A dice lands on a six 37 times. The relative frequency is 0.74.

2) A dice lands on four 37 times. The relative frequency is 0.37.

3) A dice lands on three 3 times. The relative frequency is 0.15.

4) A dice lands on three 12 times. The relative frequency is 0.3.

5) A coin lands on tails 12 times. The relative frequency is 0.25.

6) A coin lands on heads 6 times. The relative frequency is 0.25.

7) A coin lands on tails 9 times. The relative frequency is 0.3.

8) A coin lands on heads 45 times. The relative frequency is 0.9.

9) A spinner lands on green 49 times. The relative frequency is 0.7.

10) A spinner lands on white 9 times. The relative frequency is 0.45.

11) A spinner lands on red 26 times. The relative frequency is 0.52.

12) A spinner lands on blue 15 times. The relative frequency is 0.5.

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Relative Frequency - Worksheet

Group C - Calculating the number of events given the relative frequency

Work out the number of times the event occurred given the total number of experiments and the relative frequency:

1) A dice is rolled 100 times. The relative frequency of scoring a 2 is 0.46.

2) A dice is rolled 50 times. The relative frequency of scoring a 2 is 0.46.

3) A dice is rolled 200 times. The relative frequency of scoring a 2 is 0.46.

4) A dice is rolled 500 times. The relative frequency of scoring a 2 is 0.46.

5) A spinner is spun 10 times. The relative frequency of it landing on white is 0.3.

6) A spinner is spun 30 times. The relative frequency of it landing on white is 0.3.

7) A spinner is spun 90 times. The relative frequency of it landing on white is 0.3.

8) A spinner is spun 180 times. The relative frequency of it landing on white is 0.3.

9) A coin is thrown 100 times. The relative frequency of it landing on heads is 0.68.

10) A coin is thrown 50 times. The relative frequency of it landing on heads is 0.68.

11) A coin is thrown 150 times. The relative frequency of it landing on heads is 0.68.

12) A coin is thrown 300 times. The relative frequency of it landing on heads is 0.68.

Relative Frequency - Worksheet

Applied

1) A spinner has three sections, labelled A, B and C. The table below shows the relative frequency for the sections labelled A and C.

	A	B	C
Frequency	0.38		0.24

(a) Work out the relative frequency for the section labelled B.

(b) The spinner is spun 500 times. Estimate the number of times the spinner lands on C.

2) In 20 football matches played between Team A and Team B it is noted that Team A won 12 matches.

(a) What is the relative frequency of Team A winning a match?

(b) What is the relative frequency of Team B winning a match?

3) **(a)** A coin has been thrown 100 times. The coin landed on heads 79 times. Calculate the relative frequency of the coin landing on heads.

(b) Is this a biased coin? Explain your answer.

4) A dice is rolled in a series of trials. The table below shows the results.

Score	1	2	3	4	5	6
Frequency	14	6	17	14	15	14

(a) Work out the relative frequency of the dice landing on a 3

(b) Work out the relative frequency of the dice landing on an even number.

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Relative Frequency - Exam Questions

1) The probability that a biased dice will land on a five is 0. 4.

Lewis is going to roll the dice 400 times.

Work out an estimate for the number of times the dice will land on a five.

.....

(2 marks)

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2) **(a)** A bag contains only red, green and white counters.

The table below shows the probability that a counter chosen at random from the bag will be red or green.

Colour	Red	Green	White
Probability	0.5	0.3	

Jake takes a counter from the bag.

Workout the probability that Jake takes a white counter.

.....

(2)

(b) The bag contains 50 counters.

Work out how many green counters there are in the bag.

.....

(2)

(4 marks)

Relative Frequency - Exam Questions

3) **(a)** John wants to test if a coin is biased. He throws the coin 30 times.

Here are his results.

H T H T H H H T H H

H T H H H T H H H T

H H H H T H H H T H

Complete the relative frequency table.

	Heads	Tails
Relative Frequency		

.....

(2)

(b) Is the coin biased?
Explain your answer.

.....

.....

(1)

(b) John decides to throw the coin 150 times.
Calculate an estimate for the number of times the coin will land on heads.

.....

(2)

(5 marks)

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Relative Frequency - Exam Questions

4) A spinner lands on A, B, C or D.

The relative frequencies after 200 spins are shown in the table below.

	A	B	C	D
Relative Frequency	0.25	0.4	0.2	0.15

(a) How many times did the spinner land on A?

.....

(2)

(b) How many times did the spinner land on C?

.....

(2)

(c) How many more times did the spinner land on B than D?

.....

(3)

(7 marks)

Relative Frequency - Answers

	Question	Answer
	Skill Questions	
Group A	Calculate the relative frequency for the events below, as fractions in their simplest form. A coin is flipped 50 times, and lands on: **1)** Heads 20 times **2)** Tails 30 times **3)** Heads 18 times A coin is flipped 120 times, and lands on: **4)** Tails 35 times **5)** Heads 85 times **6)** Tails 72 times A dice is rolled 80 times, and scores: **7)** 3, 17 times **8)** 2, 6 times **9)** 5, 12 times A dice is rolled 60 times, and scores: **10)** 6, 18 times **11)** 4, 13 times **12)** 1, 14 times	 **1)** $\frac{2}{5}$ **2)** $\frac{3}{5}$ **3)** $\frac{9}{25}$ **4)** $\frac{7}{24}$ **5)** $\frac{17}{24}$ **6)** $\frac{3}{5}$ **7)** $\frac{17}{80}$ **8)** $\frac{3}{40}$ **9)** $\frac{3}{20}$ **10)** $\frac{3}{10}$ **11)** $\frac{13}{60}$ **12)** $\frac{7}{30}$

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Relative Frequency - Answers

Group B	Work out the total number of experiments given the result and the relative frequency:	
	1) A dice lands on a six 37 times. The relative frequency is 0.74.	**1)** 50
	2) A dice lands on four 37 times. The relative frequency is 0.37.	**2)** 100
	3) A dice lands on three 3 times. The relative frequency is 0.15.	**3)** 20
	4) A dice lands on three 12 times. The relative frequency is 0.3.	**4)** 40
	5) A coin lands on tails 12 times. The relative frequency is 0.25.	**5)** 48
	6) A coin lands on heads 6 times. The relative frequency is 0.25.	**6)** 24
	7) A coin lands on tails 9 times. The relative frequency is 0.3.	**7)** 30
	8) A coin lands on heads 45 times. The relative frequency is 0.9.	**8)** 50
	9) A spinner lands on green 49 times. The relative frequency is 0.7.	**9)** 70
	10) A spinner lands on white 9 times. The relative frequency is 0.45.	**10)** 20
	11) A spinner lands on red 26 times. The relative frequency is 0.52.	**11)** 50
	12) A spinner lands on blue 15 times. The relative frequency is 0.5.	**12)** 30

Relative Frequency - Answers

Group C	Work out the number of times the event occurred given the total number of experiments and the relative frequency: **1)** A dice is rolled 100 times. The relative frequency of scoring a 2 is 0.46. **2)** A dice is rolled 50 times. The relative frequency of scoring a 2 is 0.46. **3)** A dice is rolled 200 times. The relative frequency of scoring a 2 is 0.46. **4)** A dice is rolled 500 times. The relative frequency of scoring a 2 is 0.46. **5)** A spinner is spun 10 times. The relative frequency of it landing on white is 0.3. **6)** A spinner is spun 30 times. The relative frequency of it landing on white is 0.3. **7)** A spinner is spun 90 times. The relative frequency of it landing on white is 0.3. **8)** A spinner is spun 180 times. The relative frequency of it landing on white is 0.3. **9)** A coin is thrown 100 times. The relative frequency of it landing on heads is 0.68. **10)** A coin is thrown 50 times. The relative frequency of it landing on heads is 0.68. **11)** A coin is thrown 150 times. The relative frequency of it landing on heads is 0.68. **12)** A coin is thrown 300 times. The relative frequency of it landing on heads is 0.68.	**1)** 46 **2)** 23 **3)** 92 **4)** 230 **5)** 3 **6)** 9 **7)** 27 **8)** 54 **9)** 68 **10)** 34 **11)** 102 **12)** 204

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Relative Frequency - Answers

	Question	Answer
	Applied Questions	
1)	**a)** A spinner has three sections, labelled A, B and C. The table below shows the relative frequency for the sections labelled A and C. | | A | B | C | | Frequency | 0.38 | | 0.24 | Work out the relative frequency for the section labelled B. **b)** The spinner is spun 500 times. Estimate the number of times the spinner lands on C.	**a)** 0.38 **b)** $500 \times 0.24 = 120$
2)	**a)** In 20 football matches played between Team A and Team B it is noted that Team A won 12 matches. What is the relative frequency of Team A winning a match? **b)** What is the relative frequency of Team B winning a match?	**a)** 0.6 **b)** 0.4
3)	**a)** A coin has been thrown 100 times. The coin landed on heads 79 times. Calculate the relative frequency of the coin landing on heads. **b)** Is this a biased coin? Explain your answer.	**a)** 0.79 **b)** Yes. You would expect the relative frequency of heads to be closer to half.
4)	**a)** A dice is rolled in a series of trials. The table below shows the results. | Score | 1 | 2 | 3 | 4 | 5 | 6 | | Frequency | 14 | 6 | 17 | 14 | 15 | 14 | Work out the relative frequency of the dice landing on a 3. **b)** Work out the relative frequency of the dice landing on an even number.	**a)** $\frac{17}{80}$ **b)** $\frac{34}{80} = \frac{17}{40}$

Relative Frequency - Mark Scheme

<table>
<tr><th></th><th>Question</th><th>Answer</th><th></th></tr>
<tr><td></td><td>Exam Questions</td><td></td><td></td></tr>
<tr><td>1)</td><td>The probability that a biased dice will land on a 5 is 0.4.

Lewis is going to roll the dice 400 times.

Work out an estimate for the number of times the dice will land on a five.</td><td>400×0.4 (1)
160 (1)</td><td>(2)</td></tr>
<tr><td>2) (a)</td><td>A bag contains only red, green and white counters.

Below, the table shows the probability that a counter chosen at random from the bag will be red or green.

<table><tr><td>Colour</td><td>Red</td><td>Green</td><td>White</td></tr><tr><td>Probability</td><td>0.5</td><td>0.3</td><td></td></tr></table>
Jake takes a counter from the bag.

Workout the probability that Jake takes a white counter.</td><td>(a) $1 - 0.8$ (1)
0.2 (1)</td><td>(2)</td></tr>
<tr><td>(b)</td><td>The bag contains 50 counters.

Work out how many green counters there are in the bag.</td><td>(b) 50×0.3 (1)
15 (1)</td><td>(2)</td></tr>
</table>

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Relative Frequency - Mark Scheme

3)	**(a)** John wants to test if a coin is biased. He throws the coin 30 times. Here are his results. H T H T H H H T H H H T H H H T H H H T H H H H T H H H T H Complete the relative frequency table. | | Heads | Tails | | Relative Frequency | | |	**(a)** Heads $\frac{22}{30}$ or $\frac{11}{15}$ **(1)** Tails $\frac{8}{30}$ or $\frac{4}{15}$ **(1)** | | Heads | Tails | | Relative Frequency | $\frac{11}{15}$ | $\frac{4}{15}$ |	**(2)**
	(b) Is the coin biased? Explain your answer.	**(b)** Yes, you would expect an equal probability, so the numbers should be closer. **(1)**	**(1)**
	(c) John decides to throw the coin 150 times. Calculate an estimate for the number of times the coin will land on heads.	**(c)** $150 \times \frac{11}{15}$ **(1)** 110 **(1)**	**(2)**
4)	A spinner lands on A, B, C or D. The relative frequencies after 200 spins are shown in the table below. | | A | B | C | D | | Relative Frequency | 0.25 | 0.4 | 0.2 | 0.15 |		
	(a) How many times did the spinner land on A?	**(a)** 0.25×200 **(1)** 50 **(1)**	**(2)**
	(b) How many times did the spinner land on C?	**(b)** 0.2×200 **(1)** 40 **(1)**	**(2)**
	(c) How many more times did the spinner land on B than D?	**(c)** $0.4 \times 200 = 80$ **(1)** $0.15 \times 200 = 30$ **(1)** $80 - 30 = 50$ **(1)**	**(3)**

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