



Frequency distribution table

QUESTION 1 Draw up a frequency distribution table for each set of data below.

- a 9 13 11 11 9 10 11 10  
11 12 10 10 12 10 9 8  
7 10 11 13 12 13 11 13

- b 5 4 2 4 7 6 4 4  
3 5 7 8 7 4 3 4  
4 4 8 7

Score (x)	Tally	Frequency (f)

Score (x)	Tally	Frequency (f)

QUESTION 2 Draw up a frequency distribution table for each set of data below.

- a 8 10 12 12 10 12 14 16  
14 16 12 14 12 10 8 12  
14 8 10 12 16 12 14 8  
10

- b 3 4 6 7 2 0 2 4  
5 6 4 5 3 4 6 7  
4 5 4 3 1 0 2 6  
3

Score (x)	Tally	Frequency (f)

Score (x)	Tally	Frequency (f)

## Frequency histogram and frequency polygon

**QUESTION 1** For the set of scores given:

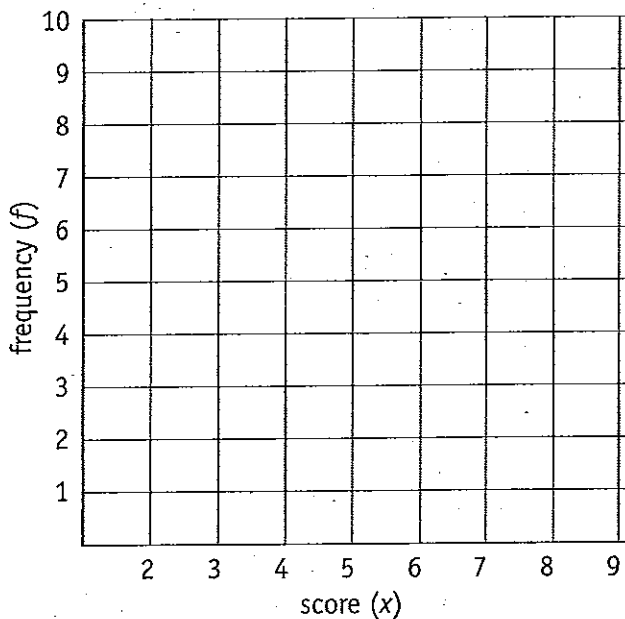
a complete the frequency distribution table

b draw a frequency histogram

c draw a frequency polygon

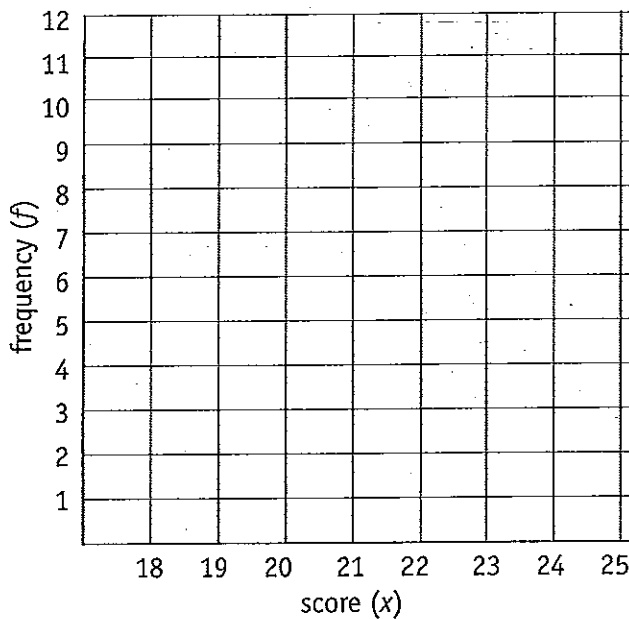
3 8 6 3 2 5 5 8 5 3 7 4 5 7 8 2 5 8 6 4  
9 7 7 6 7 8 9 7 5 5 7 6 8 6 7 6 7 7 6

Score (x)	Tally	Frequency (f)



**QUESTION 2** From the following distribution table, draw a frequency histogram and frequency polygon.

Score	18	19	20	21	22	23	24	25
Frequency	3	5	4	8	12	9	6	3





## Mean

**QUESTION 1** Find the mean of the following set of scores.

a 7, 8, 9

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b 8, 9, 10, 14

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c 10, 11, 12, 13

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d 15, 17, 19, 23

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e 3, 5, 8, 10

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f 9, 10, 13, 14, 16, 22

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**QUESTION 2** Find the mean of the following set of scores.

a 3, 3, 5, 5, 5, 5, 7, 7, 7, 7

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b 8, 8, 9, 9, 9, 8, 8, 8, 8

---



---

c 3, 3, 6, 6, 6, 7, 7, 7, 7

---



---

d 3, 3, 3, 3, 3, 4, 4, 5, 5, 6

---



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e 4, 5, 6, 7, 6, 5, 4, 3

---



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f 8, 7, 9, 6, 5, 6, 8, 7

---



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**QUESTION 3** Find the mean of the following set of scores.

a 3, 3, 3, 6, 6, 8, 8, 8, 8

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b 2, 2, 4, 4, 4, 5, 6, 8

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c 6, 6, 6, 8, 8, 8, 8, 8, 9, 9, 9, 9

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d 5, 5, 5, 6, 6, 6, 7, 7, 7, 7, 8, 8, 8

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**QUESTION 4** Complete each table and calculate the mean.

a

$x$	$f$	$fx$
2	1	
3	2	
4	2	
5	3	
6	2	
7	2	

b

$x$	$f$	$fx$
1	2	
2	2	
3	2	
4	1	
5	3	
6	3	

c

$x$	$f$	$fx$
4	3	
5	1	
6	2	
7	1	
8	1	
9	1	

## Mode

**QUESTION 1** What is the mode of the following sets of scores?

a 2, 2, 3, 8, 9, 3, 2, 5, 2, 3

\_\_\_\_\_

b 6, 7, 5, 6, 8, 6, 3, 4, 6, 5, 6

\_\_\_\_\_

c 2, 3, 4, 3, 3, 2, 2, 3, 3, 3, 1

\_\_\_\_\_

d 5, 3, 4, 3, 5, 5, 6, 5, 7, 5

\_\_\_\_\_

e 6, 7, 8, 9, 9, 9, 10, 5, 9, 6

\_\_\_\_\_

f 2, 5, 3, 5, 3, 5, 2, 1, 5, 5, 5, 6

\_\_\_\_\_

g 2, 3, 5, 2, 1, 2, 3, 2

\_\_\_\_\_

h 5, 2, 4, 4, 4, 5, 4, 4, 6, 3

\_\_\_\_\_

**QUESTION 2** Find the mode from each set of scores.

a 6, 5, 7, 5, 8, 6, 5, 7, 5

\_\_\_\_\_

b 6, 5, 6, 7, 4, 3, 6, 6, 2, 6

\_\_\_\_\_

c 5, 6, 4, 7, 7, 5, 7, 7, 5, 4, 7, 7, 8

\_\_\_\_\_

d 5, 6, 8, 6, 5, 6, 5, 6, 6, 6, 7, 6, 6

\_\_\_\_\_

e 16, 15, 16, 19, 16, 17, 16, 16

\_\_\_\_\_

f 7, 8, 7, 6, 7, 5, 7, 7, 5, 7, 7

\_\_\_\_\_

g 42, 37, 38, 42, 43, 42, 42, 44, 42

\_\_\_\_\_

h 6, 1, 2, 6, 4, 6, 4, 6, 3, 2, 6, 6, 1, 6

\_\_\_\_\_

**QUESTION 3** Select the mode from each set of scores.

a 5, 6, 6, 5, 7, 5, 8, 5, 5, 7

\_\_\_\_\_

b 3, 4, 5, 5, 3, 3, 3, 4, 3, 7

\_\_\_\_\_

c 2, 3, 4, 3, 2, 1, 3, 3, 4, 3

\_\_\_\_\_

d 4, 3, 6, 6, 3, 6, 5, 6, 7, 6, 6

\_\_\_\_\_

e 2, 3, 4, 4, 5, 4, 5, 4, 6, 5, 4, 4, 4, 3, 4

\_\_\_\_\_

f 7, 8, 9, 7, 10, 7, 8, 7, 9, 7, 9, 7, 5, 7

\_\_\_\_\_

**QUESTION 4** Find the mode for each set of scores.

a 7, 8, 7, 7, 9, 7, 8, 7, 7, 7

\_\_\_\_\_

b 6, 7, 8, 7, 6, 5, 6, 6, 7, 6

\_\_\_\_\_

c 9, 8, 11, 11, 8, 11, 10, 11, 12, 11, 11

\_\_\_\_\_

d 5, 6, 7, 7, 8, 7, 8, 7, 9, 8, 7, 7, 7, 6, 7

\_\_\_\_\_

e 10, 11, 12, 10, 13, 10, 11, 10, 11, 10, 12, 10, 8, 10

\_\_\_\_\_

f 8, 9, 8, 8, 10, 8, 9, 8, 8, 8

\_\_\_\_\_



## Median

**QUESTION 1** Find the median of the following sets of scores.

a 8, 9, 10, 12, 10

\_\_\_\_\_

b 11, 14, 18, 13, 11

\_\_\_\_\_

c 5, 8, 9, 8, 9, 10, 9

\_\_\_\_\_

d 12, 16, 18, 14, 13

\_\_\_\_\_

e 6, 4, 7, 5, 8

\_\_\_\_\_

f 21, 23, 20, 18, 18

\_\_\_\_\_

**QUESTION 2** What is the median of each set of scores?

a 4, 5, 6, 8, 6

\_\_\_\_\_

b 13, 16, 20, 15, 13, 14, 13

\_\_\_\_\_

c 3, 6, 7, 6, 7, 8, 7

\_\_\_\_\_

d 9, 13, 15, 11, 10

\_\_\_\_\_

e 8, 6, 9, 7, 10

\_\_\_\_\_

f 16, 18, 15, 13, 13

\_\_\_\_\_

**QUESTION 3** Find the median of the following sets of scores.

a 8, 9, 10, 11, 12

\_\_\_\_\_

b 42, 52, 32, 22, 52, 72, 62

\_\_\_\_\_

c 13, 15, 8, 12, 9, 14, 10, 11, 15

\_\_\_\_\_

d 7, 10, 5, 2, 1, 2, 7, 6, 4, 3, 10

\_\_\_\_\_

e 9, 1, 6, 3, 2, 5, 7, 8, 4, 7, 9

\_\_\_\_\_

f 2, 7, 1, 5, 8, 5, 3, 6, 7, 8, 8

\_\_\_\_\_

**QUESTION 4** Find the median of the following sets of scores.

a 30, 33, 25, 26, 29, 30, 33

\_\_\_\_\_

b 8, 7, 6, 8, 5, 13, 9, 9, 3

\_\_\_\_\_

c 5, 8, 13, 10, 9, 10, 13, 8, 5, 4, 5

\_\_\_\_\_

d 5, 11, 4, 8, 11, 8, 6, 9, 10, 11, 11

\_\_\_\_\_

e 5, 9, 11, 7, 6, 7, 6, 5, 9

\_\_\_\_\_

f 14, 10, 16, 13, 11, 12, 11

\_\_\_\_\_

g 3, 6, 4, 9, 22, 3, 6

\_\_\_\_\_

h 8, 12, 15, 13, 12

\_\_\_\_\_

i 5, 7, 9, 10, 11, 2

\_\_\_\_\_

j 7, 6, 5, 7, 4, 12, 10, 10, 4

\_\_\_\_\_

## Range

**QUESTION 1** Find the range of the following sets of scores.

a 8, 2, -1, 4, 5, 7, 0

b 3, 8, 11, 5, 9, 1, 3, 8, 15

c 5, 3, 4, 2, 8, 13

d 14, 11, 7, 6, 13, 11, 12

e 6, 8, 8, 5, 10, 12, 14

f 7, 4, 5, 12, 17, 4, 3

g 10, 7, 12, 22, 1, 23

h 19, 21, 27, 19, 17, 3

**QUESTION 2** Find the range of each set of scores.

a 3, 5, 2, 1, 7, 20, 3, 6

b 0, 1, 2, 3, 5, 8, 18, 1, 0, 9

c 6, 11, 9, 14, 69, 10, 11, 12

d 6, 13, 17, 31, 12, 39

e 7, 10, 5, 3, 14, 13, 18, 21

f 10, 12, 14, 17, 18, 24, 9

g 8, 10, 22, 38, 65, 1

h 5, 10, 15, 20, 30, 35, 40

**QUESTION 3** Find the range of the following sets of scores.

a 6, 8, 9, 3, 5, 1, 17

b 1, 5, 0, 3, 8, 12, 31, 54

c 1, 7, 8, 3, 16, 7, 8, 33

d 4, 5, 3, 1, 9, 15, 28, 34

e 52, 39, 52, 16, 16, 50

f 6, 20, 28, 27, 34, 32, 34

**QUESTION 4** Find the range of each set of scores.

a 9, 14, 12, 34, 28

b 5, 9, 10, 3, 15, 29, 61

c 2, 5, 1, 8, 36, 72, 18

d 10, 12, 14, 17, 24, 9, 15, 16, 18

e 15, 3, 8, 5, 7, 3, 2, 25, 39

f 6, 4, 11, 20, 11, 67, 34



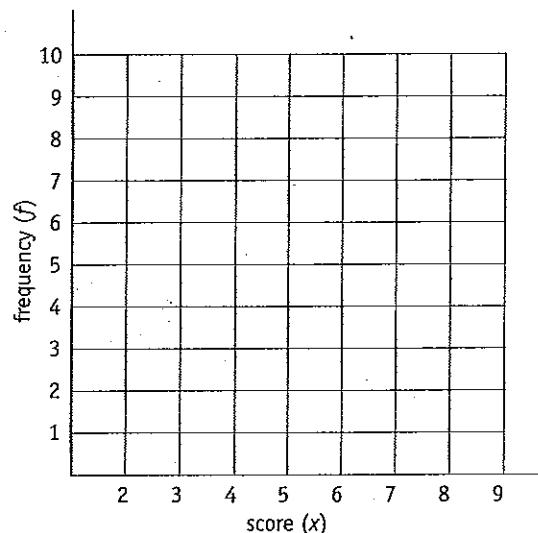
## Miscellaneous questions

**QUESTION 1** The following survey involves the test results obtained by a class of 30 students.

4 8 6 4 5 6 6 5 6 7 5 5 5 7 8  
9 5 6 7 5 4 3 2 5 6 8 7 8 6 8

- a Draw a frequency distribution table.
- b Draw a frequency histogram.
- c Draw a frequency polygon.
- d Calculate the mean.
- e Find the mode.
- f Find the median.
- g Find the range.

Score ( $x$ )	Tally	Frequency ( $f$ )

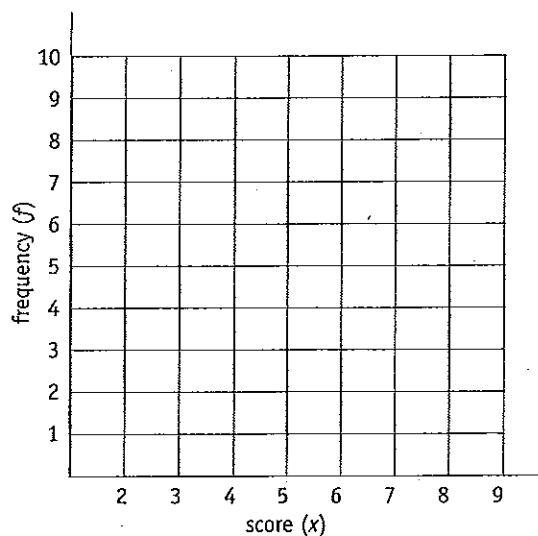


**QUESTION 2** Twenty-five families were surveyed as to how many children were in the family. The following data was obtained.

6 4 2 3 1 4 0 2 3 2 1 2 3  
2 2 1 4 3 2 0 2 5 4 5 1

- a Draw a frequency distribution table.
- b Draw a frequency histogram.
- c Draw a frequency polygon.
- d Calculate the mean.
- e Find the mode.
- f Find the median.
- g Find the range.

Score ( $x$ )	Tally	Frequency ( $f$ )



## Basic probability

**QUESTION 1** A die is thrown once. Find the probability of showing:

- |           |                          |                  |
|-----------|--------------------------|------------------|
| a a three | b a prime number         | c an even number |
| _____     | _____                    | _____            |
| d a seven | e any number from 1 to 6 | f a two or six   |
| _____     | _____                    | _____            |

**QUESTION 2** From the letters of the word PROBABILITY, one letter is selected at random. What is the probability that the letter is:

- |       |           |            |
|-------|-----------|------------|
| a P?  | b A or B? | c a vowel? |
| _____ | _____     | _____      |

**QUESTION 3** A card is drawn at random from a pack of 52 playing cards. Find the probability that the card is:

- |              |                |                   |
|--------------|----------------|-------------------|
| a a club     | b a black card | c a jack          |
| _____        | _____          | _____             |
| d a red card | e not a spade  | f a king or queen |
| _____        | _____          | _____             |

**QUESTION 4** A bag contains 8 green, 12 yellow and 5 white balls. If a ball is drawn at random, find the probability that it is:

- |             |             |         |
|-------------|-------------|---------|
| a green     | b yellow    | c white |
| _____       | _____       | _____   |
| d not green | e not white | f pink  |
| _____       | _____       | _____   |

**QUESTION 5** A 3-digit number is to be formed from the digits 5, 4 and 6. What is the probability that the number is:

- |                           |                         |
|---------------------------|-------------------------|
| a greater than 600? _____ | b even? _____           |
| c odd? _____              | d divisible by 5? _____ |

**QUESTION 6** The numbers from 1 to 15 are written on separate cards. One card is chosen at random. Find the probability that the number is:

- |   |                         |
|---|-------------------------|
| a even _____                            | b odd _____             |
| c ten _____                             | d more than ten _____   |
| e less than ten _____                   | f a prime number _____  |
| g divisible by 5 _____                  | h divisible by 3 _____  |
| i less than 12 but greater than 8 _____ | j a multiple of 6 _____ |





## Probability and tree diagrams

**QUESTION 1** A three-digit number is to be formed from the digits 1, 6 and 8.  
What is the probability that the number will:

- a start with the digit 1? \_\_\_\_\_
- b be even? \_\_\_\_\_
- c be greater than 700? \_\_\_\_\_

**QUESTION 2** Three coins are tossed together. What is the probability of throwing:

- a three heads? \_\_\_\_\_
- b two heads and a tail? \_\_\_\_\_
- c three tails? \_\_\_\_\_
- d two tails and a head? \_\_\_\_\_
- e at least two tails? \_\_\_\_\_

**QUESTION 3** A bag contains 8 two dollar coins and 7 one dollar coins.  
A coin is drawn at random.  
What is the probability that it is:

- a a two dollar coin? \_\_\_\_\_
- b a one dollar coin? \_\_\_\_\_
- c a twenty cent coin? \_\_\_\_\_
- d a gold-coloured coin? \_\_\_\_\_

**QUESTION 4** Three cards with the names Michael, Michelle and Melony are put into a box.  
One card is drawn at random from the box.  
What is the probability that the name is:

- a Michelle? \_\_\_\_\_
- b a boy's name? \_\_\_\_\_
- c a girl's name? \_\_\_\_\_

**QUESTION 5** A die is thrown once. What is the probability of throwing:

- a a five? \_\_\_\_\_
- b an odd number? \_\_\_\_\_
- c a number less than 7? \_\_\_\_\_
- d a zero? \_\_\_\_\_

# Statistics and probability

## Problem solving, statistics and probability

- 1** A coin is tossed twice. What is the probability of throwing two heads?
- \_\_\_\_\_
- \_\_\_\_\_
- 2** A letter is chosen at random from the word MATHEMATICS. Find the probability that it will be:
- a a T or M \_\_\_\_\_
- b a vowel \_\_\_\_\_
- c a consonant \_\_\_\_\_
- d H, C or S \_\_\_\_\_
- 3** A die is thrown once. Find the probability that it is a number:
- a greater than 3 \_\_\_\_\_
- b a number greater than 6 \_\_\_\_\_
- c a square number \_\_\_\_\_
- 4** The numbers 1 to 7 are written on separate cards. One card is chosen at random. What is the probability that the number is:
- a odd? \_\_\_\_\_
- b even? \_\_\_\_\_
- c a seven? \_\_\_\_\_
- d divisible by 3? \_\_\_\_\_
- e a prime number? \_\_\_\_\_
- 5** A bag contains 6 red, 5 yellow and 4 white balls. If a ball is drawn at random, find the probability that is:
- a red \_\_\_\_\_
- b white \_\_\_\_\_
- c blue \_\_\_\_\_
- d yellow \_\_\_\_\_
- e red, yellow or white \_\_\_\_\_
- f not red \_\_\_\_\_

# Statistics and probability

## TOPIC TEST

## PART A

- Instructions**
- This part consists of 15 multiple choice questions
  - Fill in only ONE CIRCLE for each question
  - Each question is worth 1 mark
  - Calculators may be used

**Time allowed: 15 minutes**

**Total marks = 15**

	Marks
<p><b>1</b> From the set of scores 3, 1, 4, 6, 5, 5, 7, 3, 4, 5, 4, 5, 7, the mode is</p> <p>(A) 6                      (B) 4.538                      (C) 5                      (D) 4</p>	<input type="text" value="1"/>
<p><b>2</b> Find the range of the scores 4, 3, 5, 1, 2, 8, 7, 10, 6, 9.</p> <p>(A) 7                      (B) 8                      (C) 9                      (D) 10</p>	<input type="text" value="1"/>
<p><b>3</b> What is the difference between the mean and the mode of the scores 20, 40, 50, 20, 60?</p> <p>(A) 2                      (B) 12                      (C) 18                      (D) 20</p>	<input type="text" value="1"/>
<p><b>4</b> The mean of the scores 3, 5, 3, 3, 7, 3, 6, 5, 4, 3 equals</p> <p>(A) 4.1                      (B) 4.2                      (C) 3                      (D) 5</p>	<input type="text" value="1"/>
<p><b>5</b> The median of the scores 1, 2, 3, 5, 3, 2, 1, 6, 3, 1, 2, 8, 9 is</p> <p>(A) 1                      (B) 2                      (C) 3                      (D) 5</p>	<input type="text" value="1"/>
<p><b>6</b> A letter is chosen at random from the word AUSTRALIA. Find the probability that it is a vowel.</p> <p>(A) <math>\frac{2}{9}</math>                      (B) <math>\frac{3}{9}</math>                      (C) <math>\frac{4}{9}</math>                      (D) <math>\frac{5}{9}</math></p>	<input type="text" value="1"/>
<p>A bag contains 3 red, 4 blue and 5 yellow balls. Find the probability of choosing at random:</p>	
<p><b>7</b> a red ball</p> <p>(A) <math>\frac{1}{3}</math>                      (B) <math>\frac{1}{4}</math>                      (C) <math>\frac{1}{2}</math>                      (D) <math>\frac{2}{3}</math></p>	<input type="text" value="1"/>
<p><b>8</b> either a blue or yellow ball</p> <p>(A) <math>\frac{1}{3}</math>                      (B) <math>\frac{1}{4}</math>                      (C) <math>\frac{1}{2}</math>                      (D) <math>\frac{3}{4}</math></p>	<input type="text" value="1"/>
<p><b>9</b> a ball that is not blue</p> <p>(A) <math>\frac{1}{3}</math>                      (B) <math>\frac{1}{4}</math>                      (C) <math>\frac{1}{2}</math>                      (D) <math>\frac{2}{3}</math></p>	<input type="text" value="1"/>

10 a white ball

(A) 0

(B)  $\frac{1}{4}$

(C)  $\frac{1}{2}$

(D) 1

Mark

1

A card is chosen at random from a pack of 52 playing cards. Find the probability that the card is:

11 an ace

(A)  $\frac{1}{13}$

(B)  $\frac{7}{13}$

(C)  $\frac{1}{26}$

(D)  $\frac{1}{4}$

1

12 a red king

(A)  $\frac{1}{13}$

(B)  $\frac{7}{13}$

(C)  $\frac{1}{26}$

(D)  $\frac{1}{4}$

1

13 a diamond

(A)  $\frac{1}{13}$

(B)  $\frac{7}{13}$

(C)  $\frac{1}{26}$

(D)  $\frac{1}{4}$

1

14 black or a king

(A)  $\frac{1}{13}$

(B)  $\frac{7}{13}$

(C)  $\frac{1}{26}$

(D)  $\frac{1}{4}$

1

15 either a five, a six or a seven

(A)  $\frac{1}{13}$

(B)  $\frac{2}{13}$

(C)  $\frac{3}{13}$

(D)  $\frac{4}{13}$

1

Total marks achieved for PART A

1

# Statistics and probability

## TOPIC TEST

## PART B

- Instructions**
- This part consists of 15 questions.
  - Each question is worth 1 mark.
  - Write answers in the 'Answers only' column.

**Time allowed: 15 minutes**

**Total marks = 15**

Questions	Answers only	Marks
For the scores 3, 5, 7, 3, 4, 3, 2, 3, 3, find:		
<b>1</b> the mean		1
<b>2</b> the mode		1
<b>3</b> the median		1
<b>4</b> the range		1
For the set of scores given, find:		
<b>5</b> the mode		1
<b>6</b> the median		1
<b>7</b> the mean		1
<b>8</b> the range		1
A die is thrown. Find the probability of throwing:		
<b>9</b> a three		1
<b>10</b> a seven		1
<b>11</b> a number greater than 2		1
<b>12</b> a prime number		1
<b>13</b> an even number		1
The numbers from 1 to 20 are written on separate cards. If a card is selected at random, what is the probability that the number is:		
<b>14</b> an odd number?		1
<b>15</b> a square number?		1

**Total marks achieved for PART B**

15
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# Statistics and probability

## TOPIC TEST

PART

- Instructions**
- This part consists of 4 questions
  - Each question is worth 5 marks
  - Show all necessary working

**Time allowed: 20 minutes**

**Total marks = 20**

- 1** For the set of scores 8, 11, 3, 5, 2, 2, 12, 6:
- a find the mode \_\_\_\_\_      b find the mean \_\_\_\_\_
- c arrange the scores in ascending order \_\_\_\_\_
- d find the median \_\_\_\_\_      e find the range \_\_\_\_\_

Mar

5

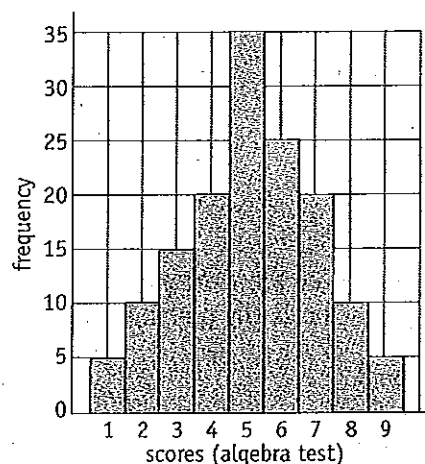
- 2** A die is rolled and the following results obtained; 6, 1, 2, 6, 6, 6, 3
- a How many times was the die thrown? \_\_\_\_\_
- b How many times was the result 6? \_\_\_\_\_
- c What fraction of the throws are 6s? \_\_\_\_\_
- d What fraction of the throws were odd numbers? \_\_\_\_\_
- e What fraction of the throws were even numbers? \_\_\_\_\_

5

- 3** A four-digit number is to be formed from the digits 2, 3, 6 and 7. What is the probability that the number will:
- a start with a 7? \_\_\_\_\_      b be an odd number? \_\_\_\_\_
- c be an even number? \_\_\_\_\_      d be greater than 6000? \_\_\_\_\_
- e be less than 3000? \_\_\_\_\_

5

- 4**
- a What is the mode of the distribution?  
\_\_\_\_\_
- b How many students scored 6 marks?  
\_\_\_\_\_
- c How many students scored more than 8 marks?  
\_\_\_\_\_
- d How many students scored less than 4 marks?  
\_\_\_\_\_
- e What is the range of the distribution?  
\_\_\_\_\_



5

**Total marks achieved for PART C**

# Answers

## PAGE 103

1 a

Score (x)	Tally	Frequency (f)
7		1
8		1
9		3
10		6
11		6
12		3
13		4

b

Score (x)	Tally	Frequency (f)
2		1
3		2
4		8
5		2
6		1
7		4
8		2

2 a

Score (x)	Tally	Frequency (f)
8		4
10		5
12		8
14		5
16		3

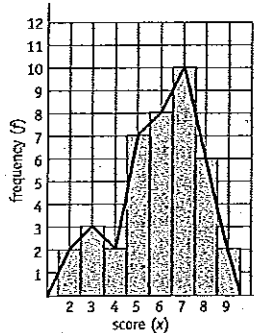
b

Score (x)	Tally	Frequency (f)
0		2
1		1
2		3
3		4
4		6
5		3
6		4
7		2

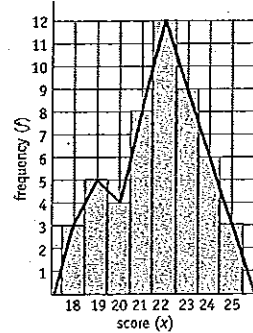
## PAGE 104 1 a

Score (x)	Tally	Frequency (f)
2		2
3		3
4		2
5		7
6		8
7		10
8		6
9		2

b



2



**PAGE 105** 1 a 8 b 10.25 c 11.5 d 18.5 e 6.5 f 14 2 a 5.4 b 8.3 c 5.7 d 3.9 e 5 f 7 3 a 5.8

b 4.375 c 7.83 d 6.54 4 a 2, 6, 8, 15, 12, 14; 4.75 b 2, 4, 6, 4, 15, 18; 3.77 c 12, 5, 12, 7, 8, 9; 5.8

**PAGE 106** 1 a 2 b 6 c 3 d 5 e 9 f 5 g 2 h 4 2 a 5 b 6 c 7 d 6 e 16 f 7 g 42 h 6 3 a 5 b 3 c 3 d 6 e 4 f 7 4 a 7 b 6 c 11 d 7 e 10 f 8

**PAGE 107** 1 a 10 b 13 c 9 d 14 e 6 f 20 2 a 6 b 14 c 7 d 11 e 8 f 15 3 a 10 b 52 c 12 d 5 e 6 f 6 4 a 30 b 8 c 8 d 9 e 7 f 12 g 6 h 12 i 8 j 7

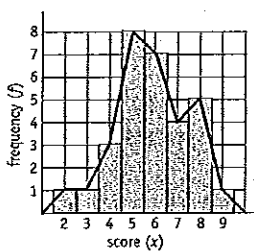
**PAGE 108** 1 a 8 b 14 c 11 d 8 e 9 f 14 g 22 h 24 2 a 19 b 18 c 63 d 33 e 18 f 15 g 64 h 35 3 a 16 b 54 c 32 d 33 e 36 f 28 4 a 25 b 58 c 71 d 15 e 37 f 63

**PAGE 109** 1 a, b, c see below d 5.86 e 5 f 6 g 7 2 a, b, c see below d 2.56 e 2 f 2 g 6

1a

Score (x)	Tally	Frequency (f)
2		1
3		1
4		3
5		8
6		7
7		4
8		5
9		1

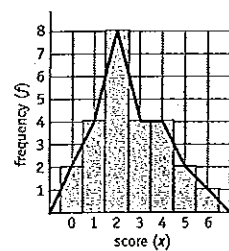
1b, c



2a

Score (x)	Tally	Frequency (f)
0		2
1		4
2		8
3		4
4		4
5		2
6		1

2b, c



**PAGE 110** 1 a  $\frac{1}{6}$  b  $\frac{1}{2}$  c  $\frac{1}{2}$  d 0 e 1 f  $\frac{1}{3}$  2 a  $\frac{1}{11}$  b  $\frac{3}{11}$  c  $\frac{4}{11}$  3 a  $\frac{1}{4}$  b  $\frac{1}{2}$  c  $\frac{1}{13}$  d  $\frac{1}{2}$  e  $\frac{3}{4}$  f  $\frac{2}{13}$

4 a  $\frac{8}{25}$  b  $\frac{12}{25}$  c  $\frac{1}{5}$  d  $\frac{17}{25}$  e  $\frac{4}{5}$  f 0 5 a  $\frac{1}{3}$  b  $\frac{2}{3}$  c  $\frac{1}{3}$  d  $\frac{1}{3}$  6 a  $\frac{7}{15}$  b  $\frac{8}{15}$  c  $\frac{1}{15}$  d  $\frac{1}{3}$  e  $\frac{3}{5}$  f  $\frac{2}{5}$

g  $\frac{1}{5}$  h  $\frac{1}{3}$  i  $\frac{1}{5}$  j  $\frac{2}{15}$

**PAGE 111** 1 a  $\frac{1}{3}$  b  $\frac{2}{3}$  c  $\frac{1}{3}$  2 a  $\frac{1}{8}$  b  $\frac{3}{8}$  c  $\frac{1}{8}$  d  $\frac{3}{8}$  e  $\frac{1}{2}$  3 a  $\frac{8}{15}$  b  $\frac{7}{15}$  c 0 d 1 4 a  $\frac{1}{3}$  b  $\frac{1}{3}$  c  $\frac{2}{3}$

5 a  $\frac{1}{6}$  b  $\frac{1}{2}$  c 1 d 0

# Answers

**PAGE 112** 1  $\frac{1}{4}$  2 a  $\frac{4}{11}$  b  $\frac{4}{11}$  c  $\frac{7}{11}$  d  $\frac{3}{11}$  3 a  $\frac{1}{2}$  b 0 c  $\frac{1}{3}$  4 a  $\frac{4}{7}$  b  $\frac{3}{7}$  c  $\frac{1}{7}$  d  $\frac{2}{7}$  e  $\frac{4}{7}$  5 a  $\frac{2}{5}$  b  $\frac{4}{15}$   
c 0 d  $\frac{1}{3}$  e 1 f  $\frac{3}{5}$

**PAGES 113 & 114** 1 C 2 C 3 C 4 B 5 C 6 D 7 B 8 D 9 D 10 A 11 A 12 C 13 D 14 D 15 C

**PAGE 115** 1 3.6 2 3 3 3 4 5 5 3 6 3 7 2.88 8 3 9  $\frac{1}{6}$  10 0 11  $\frac{2}{3}$  12  $\frac{1}{2}$  13  $\frac{1}{2}$  14  $\frac{1}{2}$  15  $\frac{1}{5}$

**PAGE 116** 1 a 2 b 6.125 c 2, 2, 3, 5, 6, 8, 11, 12 d 5.5 e 10 2 a 7 b 4 c  $\frac{4}{7}$  d  $\frac{2}{7}$  e  $\frac{5}{7}$  3 a  $\frac{1}{4}$  b  $\frac{1}{2}$   
c  $\frac{1}{2}$  d  $\frac{1}{2}$  e  $\frac{1}{4}$  4 a 5 b 25 c 5 d 30 e 8

**PAGE 117** 1  $\triangle ABC$  and  $\triangle PML$ ;  $\triangle GHI$  and  $\triangle AYZ$ ;  $\triangle MNO$  and  $\triangle JKL$ ;  $\triangle VWX$  and  $\triangle PRQ$ ;  $\triangle DEF$  and  $\triangle SUT$  2 a i  $\angle A$  and  $\angle C$ ;  $\angle ADB$  and  $\angle CDB$ ;  $\angle ABD$  and  $\angle DBC$  ii  $AD = DC$ ;  $AB = BC$ ;  $BD = BD$  b i  $\angle E = \angle G$ ,  $\angle EHF = \angle GFH$ ,  $\angle EFH = \angle GHF$  ii  $EH = FG$ ,  $EF = HG$ ,  $HF = HF$   
c i  $\angle I = \angle K$ ,  $\angle ILJ = \angle JLK$ ,  $\angle IJL = \angle KJL$  ii  $IJ = LK$ ,  $IL = JK$ ,  $LJ = LJ$  d i  $\angle P = \angle N$ ,  $\angle PMO = \angle NOM$ ,  $\angle POM = \angle NMO$  ii  $MN = PO$ ,  
 $MP = NO$ ,  $MO = MO$  e i  $\angle QTS = \angle QTR$ ,  $\angle S = \angle R$ ,  $\angle SQT = \angle RQT$  ii  $QS = QR$ ,  $QT = QT$ ,  $ST = RT$  f i  $\angle U = \angle X$ ,  $\angle UUV = \angle XVW$ ,  
 $\angle UVW = \angle XWV$  ii  $UV = XW$ ,  $VW = VW$ ,  $UW = XV$  3 a  $\triangle AOD \cong \triangle BOC$ ;  $\triangle AOB \cong \triangle COD$ ;  $\triangle ADC \cong \triangle ABC$ ;  $\triangle ABD \cong \triangle CBD$  b  $\triangle ABC \cong \triangle AED$   
and  $\triangle ABD \cong \triangle AEC$

**PAGE 118** 1 a  $\equiv$  b three sides c two angles and a side d two sides and the included angle e the hypotenuse and one side  
2 a RHS b SAS c AAS d SSS 3 a OC b  $OA = OB$  c yes d RHS

**PAGE 119** 1 a SSS b AAS c AAS 2 a SSS b SAS c RHS d AAS e SSS f SSS

**PAGE 120** 1 a AAS;  $x = 30^\circ$ ,  $y = 60^\circ$  b SAS;  $x = 11\text{cm}$ ,  $y = 115^\circ$  2 a SSS or SAS or RHS b RHS

**PAGE 121** 1 a  $\parallel$  b two angles c same ratio d one angle; the same ratio e congruent 2 a equiangular b equiangular 3 a Two  
sides in the same ratio and included angle is equal to included angle. b  $\angle A = \angle D$ ;  $\angle B = \angle E$ ;  $\angle C = \angle F$  c  $\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$

**PAGE 122** 1 a true b false c false d false e false f false g false h true 2 a  $\frac{3}{12} = \frac{5}{20}$  and  $\angle ACB = \angle ECD$  b  $\frac{AO}{OC} = \frac{BO}{OD}$   
and  $\angle AOB = \angle DOC$  3  $\triangle QSP$ ,  $\triangle PSR$ ,  $\triangle QPR$

**PAGE 123** 1 a equiangular;  $x = 5$  b equiangular;  $y = 4$  c equiangular;  $m = 20$  d two sides and the included angle;  $a = 80$ ,  
 $x = 5$  2 a equiangular;  $x = 5$  b equiangular;  $x = 5$  c equiangular;  $y = 9$  d equiangular;  $x = 4$

**PAGE 124** 1 a equiangular b  $\frac{x}{3} = \frac{6}{4}$  c  $x = 4\frac{1}{2}$  2 a equiangular b  $m = 115$  3 a equiangular b  $y = 45$  4 a BD  
b  $\angle A = \angle C$ ;  $\angle ADB = \angle CBD$  c yes d AAS 5 a  $AO = CO = BO = DO = 12\text{cm}$  b  $\angle BOC$  c SAS

**PAGES 125 & 126** 1 B 2 A 3 C 4 A 5 B 6 C 7 D 8 C 9 A 10 C 11 C 12 B 13 B 14 A 15 B

**PAGE 127** 1  $PQ = QS$ ,  $QR = QR$  2  $\angle PQR = \angle SQR$  3  $\triangle PQR \cong \triangle SQR$  4 SAS 5  $OL = ON$ ;  $OM = OM$  6  $\angle OML = \angle OMN$ ;  
 $\angle OLM = \angle ONM$ ;  $\angle LOM = \angle NOM$  7  $\triangle OML \cong \triangle OMN$  8 RHS 9  $\angle ACB = \angle DCE$ ;  $\angle CAB = \angle CED$ ;  $\angle ABC = \angle CDE$

10  $\frac{5}{25}$ ,  $\frac{3}{15}$ ,  $\frac{4}{20}$  11 yes 12 yes 13 The sides are in the same ratio,  $\frac{AB}{DE} = \frac{AC}{CE} = \frac{BC}{CD} = \frac{1}{5}$  14 equiangular 15  $x = 25$

**PAGE 128** 1  $\angle AMB = \angle AMC$ ,  $CM = BM$ ,  $AM = AM$ ; SAS 2 a  $\angle D = \angle B$ ,  $AD = CB$ ,  $AC = AC$ ; SAS b  $\angle BAC = \angle DCA$ ,  $AB \parallel DC$  (alternate  
angles equal) 3 a  $\angle BAP = \angle FEP$ ,  $\angle BPA = \angle FPA$ ,  $BP = FP$ ; AAS;  $\therefore AP = PE$  b parallelogram; diagonals bisect 4 a  $\angle ADE = \angle ABC$ ,

$\angle A = \angle A$ ,  $\angle AED = \angle ACB$  b equiangular c  $\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$

**PAGES 129 & 130** 1 D 2 C 3 A 4 B 5 A 6 D 7 C 8 D 9 C 10 A 11 A 12 C 13 D 14 D 15 B

**PAGE 131** 1 202.80 2 15.625 3  $1\frac{8}{25}$  4 \$117.36 5 49 6 5:8 7  $125a^9$  8  $\frac{4m}{5}$  9  $-a - 2b$  10 a 11  $y + 3$

12  $\frac{1}{4}$  13  $\frac{1}{9}$  14  $x^{12}$  15 143.11

**PAGE 132** 1 a 19a b  $21axy + 30xy$  c  $\frac{10n}{3}$  d  $243x^{15}y^{10}$  e  $2x^3y^2z$  2 a \$718.76 b \$1080 c \$120 d 80% e \$19.20

3 a  $2m + 2n$ ;  $mn$  b  $x + 2y + 3z$ ;  $xy$  c  $P = S - C$  4 a  $\frac{4x}{5}$  b 0 c  $\frac{a^2}{10}$  d  $\frac{8m^2}{35}$  e  $\frac{4}{3}x^5y^2$