

REPUBLIC OF



SOMALILAND

Preface

The administration of Somaliland national examination and certification board (SLNECB) authorized the compilation, production and publication of Somaliland national maths paper 1 examination books with simplified answers and solutions for secondary students. The production of these books came after a success through great and selfless effort, made by SLNECB and the teacher who compiled it. This was necessitated by the tremendous needs of the whole Somaliland secondary students in order that they get equal rights and experience in performing national examinations in particular and the international examinations in general.

I hope all Somaliland students and teachers will enjoy using these valuable books.

A blue ink signature of Daud Ahmed Farah, written in a cursive style.

Daud Ahmed Farah

Chairman of Somaliland national
examination and certification board

Republic of



Somaliland

SLNECB

Maths Paper 1 Examinations
With simplified answers

First edition 2014

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Acknowledgement

Somaliland National Examination and Certification Board (SLNECB) is very grateful to **Khadar X. Yusuf C/laahi (Khadar Al-jazeera)** for his selfless effort in the compilation of national maths paper 1 examinations and for answering all maths paper 1 examination questions in a clear and understandable manner. SLNECB would like to thank **Muktar Awmuse Hassan (Cawl)** for his crucial role in organizing and improving this book. SLNECB would also like to thank Khadar Abdi Ibrahim (bukhaari) for his overall typing, designing and contribution to this book. In general, SLNECB would also like to appreciate any person who provided direct or indirect contribution and effort of typing, suggestions, encouragement and improvement of this book.

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Chapter 1: Sets

1.1. Multiple choices

1. If $D = \{1,3,5\}$, $E = \{3,4,5\}$ and $F = \{1,5,10\}$, find $(D \cup E) \cap F$.

A	$\{1,3,4,5\}$	B	$\{1,5\}$
C	$\{1,3,4,5,10\}$	D	$\{5\}$

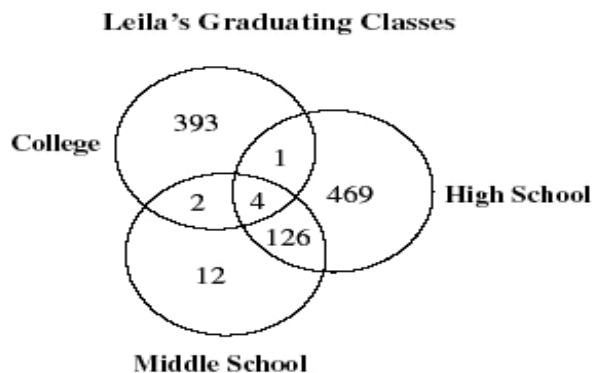
2. The number of subsets of $A = \{1, 5, 7, 12\}$ is:

- A. 8
- B. 10
- C. 16
- D. 24

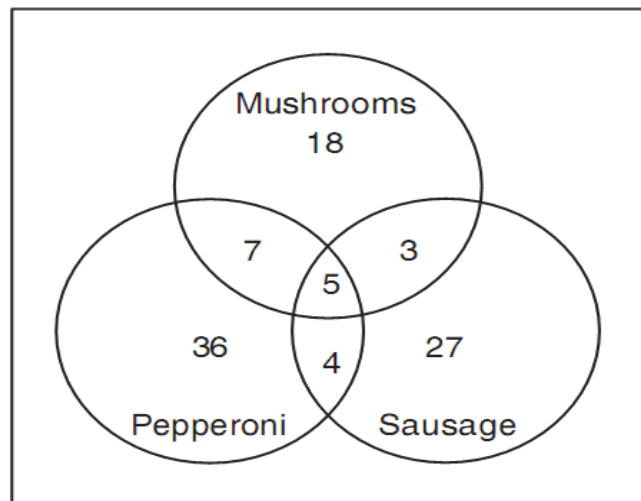
3. If $P(A \cup B) = \frac{9}{10}$ and $P(A \cap B) = \frac{3}{20}$, find $P(B)$?

- A. $\frac{7}{20}$
- B. $\frac{3}{5}$
- C. $\frac{1}{5}$
- D. $\frac{7}{10}$

4. The Venn diagram below shows Leila's graduating classes from middle school high school, and college



- How many students graduated together from both Leila's middle school and high school?
- A. 133
B. 132
C. 131
D. 130
5. Given $A = \{ a,b,c,d,e,f, \}$ and $B = \{ c,e,g,h,m, \}$ the value of $A \cup B$ is given by
- A. $\{c, e\}$
B. $\{ a,b,d,f,g,h,m \}$
C. $\{ a,b,c,d,e,f,g,h,m \}$
D. $\{ \}$
6. If set $A = \{ 1, 2, 3, 4, 5, 6, 7 \}$ and set $B = \{ 2, 4, 6, 8 \}$, then $A \cap B$ is equal to
- A. $\{ 1, 4, 6 \}$
B. $\{ 7, 4, 5 \}$
C. $\{ 2, 4, 6 \}$
D. $\{ 1, 3, 6 \}$
7. A Hargeisa hotel surveyed 100 customers to determine their favourite pizza toppings or combination of toppings. The results are shown below.



How many of the customers surveyed picked a combination of only 2 toppings as their favorite?

- A. 5
- B. 7
- C. 14
- D. 19

1.2. Structured questions

1. If $A = \{1,2,3,4\}$ and $B = \{1,3,5,7\}$ find;

i. $A \cup B$

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ii. $A \cap B$

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2. $\varepsilon = \{2,3,4,5,6,7,8,9,10,11,12\}$

$A = \{X : X \text{ is a multiple of } 2\}$

$B = \{X : X \text{ is a multiple of } 3\}$

$C = \{X : X \text{ is a multiple of } 4\}$

List

(a) $A \cap C$

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(b) $A \cup (B \cap C)$

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(c) $A' \cap (B \cup C)$.

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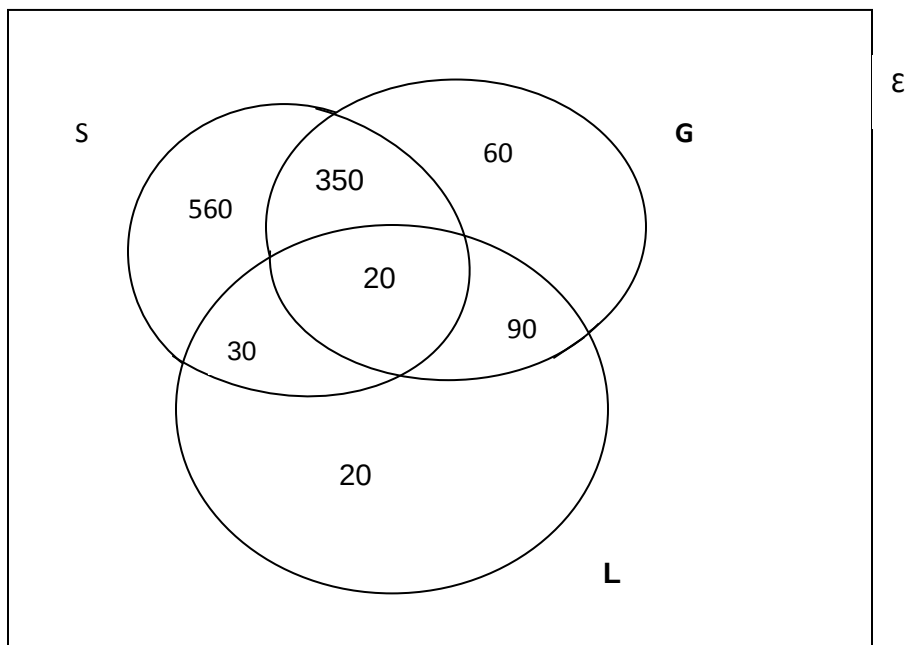
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In the Venn diagram,
 $\mathcal{E}$ = {children in a mixed school I}
 G = {girls in the school}
 S = {children who can swim}
 L = {children who are left handed}



- a) How many left-handed children are there?
.....
- b) How many girls cannot swim?
.....
- c) How many boys can swim?
.....
- d) How many girls are left handed?
.....
- e) How many left-handed girls can swim?
.....
- f) How many boys are there in the school?
.....
3. List all eight possible subsets of the set $A = \{a,b,c\}$?
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.....
4. $A = \{1, 2, 3, 4, 5, 6\}$ and $B = \{1, 3, 5, 6\}$
- i) List the members of $A \cap B$
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- ii) List the members of $A \cup B$
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Chapter 2: Exponent and logarithm

2.1. Multiple choice

1. $4^{-3} \times 4^3$ is equal to:

A. 4^{-6}

B. 1

C. 0

D. 4^{-9}

2. Find the value of: $9^{\frac{1}{2}} \times 125^{\frac{1}{3}} \times 4^0$

A	0	B	15
C	60	D	75

3. Find the value of n in $5^n = \frac{1}{625}$

A. 4

B. 5

C. 125

D. -4

4. The exact value of $3.14 (7.5^2 - 2.5^2)$ is

A. 314

B. 157

C. 31.4

D. 15.7

5. $Z^{\frac{1}{2}} \times Z^{\frac{3}{2}} \div Z^{\frac{5}{2}}$ is

A. $Z^{\frac{3}{10}}$

B. $Z^{\frac{9}{8}}$

C. $Z^{\frac{-1}{2}}$

D. $Z^{\frac{9}{2}}$

6. The value of $\frac{27^{5/3}}{\sqrt{9}}$ equals

A. 243

B. 5

C. 27

D. 81

7. The value of x in $X^{3/2} = 125$ is

A. 25

B. 5

C. 125

D. 625

8. Given $64^{1/2} = x$, then x is

A. 32

B. 4

C. 8

D. 16

9. $\sqrt{45}$ is equal to

A. $5\sqrt{3}$

B. $3\sqrt{5}$

C. 9

D. 22.5

10. If $\log_3 9 = x$, find the value x.

A. 27

B. 3

C. 3^9

D. 2

11. The value of $\text{Log}_9 3$ is

A. 3

B. 2

C. $\frac{1}{2}$

D. $\frac{1}{3}$

12. $2^4 \cdot 3^4$ is the same as

A. 5^4

B. 5^8

C. 64

D. 6^8

13. If $a = 5$ and $b = -2$, evaluate $ab^3 + ba^3$

A. - 250

B. - 290

C. - 60

D. - 40

14. The value of x in $X^{\frac{3}{2}} = 125$ is

- A. 25
- B. 5
- C. 125
- D. 625

15. $\frac{\sqrt{2}}{\sqrt{3}}$ is the same as

- A. $\sqrt{2}\sqrt{3}$
- B. $\frac{\sqrt{6}}{2}$
- C. $\frac{\sqrt{6}}{3}$
- D. $\frac{2\sqrt{3}}{3}$

16. $\sqrt{12} \times \sqrt{3}$ is equal to

A	$2\sqrt{3}$	B	6
C	9	D	$3\sqrt{2}$

17. The rationalization of $\frac{1}{3+\sqrt{2}}$ is

- A. $\frac{3-\sqrt{2}}{7}$
- B. $\frac{\sqrt{2}+4}{7}$
- C. $\frac{3-\sqrt{2}}{3}$

D. $\frac{\sqrt{2}+3}{3}$

18. when Asha tosses two coins together, the probability she get two heads is :

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. $\frac{3}{4}$

D. 3

19. $\log 2 = 0.3010$ and $\log 3 = 0.4771$ therefore $\log 36$ equals

A. 1.5562

B. 0.778

C. $\log 2 + \log 3$

D. $0.4771 - 0.3010$

20. Without using tables, evaluate $3\log_{10} 5 + \log_{10} 64 - \log_{10} 8$.

A. $3\log_{10} 81$

B. 5

C. 2

D. 1000

21. Which of the following is a simplified form of the expression?

$$\log_{21} 5 + \log_{21} 4 - \log_{21} 2$$

A. $\log_{21} 10$

B. $\log_{10} 21$

C. $\log_{21} 7$

D. $\log_7 21$

22. The expression $\text{Log}_8 64$ is equivalent to \

- A. 8
- B. $\frac{1}{2}$
- C. 2
- D. $\frac{1}{8}$

23. If $\log x = 3\log a - \log b$, then x is equal to

- A. $\frac{3a}{b}$
- B. $3a - b$
- C. $\frac{a^3}{b}$

2.2. Structured questions

1. Solve the equation $4^{x+2} = 8$

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2. Write down the value of $16^{\frac{1}{4}}$

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3. Given $\log 2 = 0.3010$ and $\log 3 = 0.4771$, what is the value of $\log 12$?

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4. Rationalize the denominator of $\frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}}$

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5. Simplify $3\sqrt{50} - 5\sqrt{32} + 4\sqrt{8}$

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6. Express $5\sqrt{72}$ in the simplest radical form.

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7. Evaluate : $\text{Log } \frac{4}{3}$ given $\text{Log } 2 = 0.3010$ and $\text{Log } 3 = 0.4771$

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8. $\text{Log}10^2 = 0.3010$, find $\log 10^8$

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9. If $\text{Log}2 = 0.301$ and $\text{Log}3 = 0.477$, what is the approximate Value of $\text{Log}72$?

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10. Solve for X: $\log_8(x + 1) = \frac{2}{3}$

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Chapter 3: Series and sequences

3.1. Multiple choices

1. The geometric sequence is 3, 9, 27,..... Then the 5th term is
 - A. 81
 - B. 243
 - C. 39
 - D. 3^5
2. The 20th term of an arithmetic sequence: 6, 4, 2, 0, __, __, __ is

A	- 32	B	- 30
C	- 28	D	- 34

3. The sum of the first two terms of a geometric progression (GP) is 21. Given that the common ratio of the GP is $\frac{1}{2}$. determine the first term o the GP.
 - A. 14
 - B. 7
 - C. 42
 - D. 12
4. What is the next term in the sequence 10, 14, 18,....
 - A. 4
 - B. 22
 - C. 32
 - D. 42

5. What is the n th term in the following sequence of numbers? 2, 5, 10, 17, 26, 37

- A. $n^2 - 1$
- B. $2n^2$
- C. $n^2 + 1$
- D. $(9n - 1)^2$

6. 2, 8, 32, 128, what is the next number in the sequence?

- A. 160
- B. 224
- C. 256
- D. 512

7. The 12th term of the arithmetic sequence: 6.1, 7.2, 8.3, ...
is

- A. 18.1
- B. 18.2
- C. 18.3
- D. 19.2

3.2. Structured questions

1. Find the 35th term and the sum of the first 35 terms of the arithmetic progression: 1, 5, 9, 13, _ , _ , _...

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2. Given that the 3rd term of an arithmetic series is 20 and the 7th term is 12.

a) Find the first term and the common difference

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b) Find the 20th term.

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3. Look at the following sequence: 1, 4, 16, 64, ...

Find

a) the first term

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b) the common ratio

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c) the 5th term

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d) The term which is 1024.

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4.

(i) The first three terms of an arithmetic series are $-1 + 4 + 9 +$
..... Find the 60th term

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(ii) find the sum of the first 60 terms of the series

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5. For the sequence 7, 16, 25, 34 Find

a) The common difference

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b) The 10th term

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c) The 56th term

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d) The nth term

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6. A runner runs 5.6 km on the first day of training.
She increases her training by 0.2 km each day.
How far will she be running by the 30th day of training?



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Chapter 4: matrices

4.1. Multiple choice

1. Given that $\begin{pmatrix} 2 & 0 \\ -1 & 3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 12 \\ -6 \end{pmatrix}$, then $x+y$ is

A. 46

B. 4

C. 3

D. 0

2. The inverse of $\begin{pmatrix} 2 & -4 \\ 5 & 3 \end{pmatrix}$ is

A. $\begin{pmatrix} 3 & 4 \\ -5 & 2 \end{pmatrix}$

B. $\begin{pmatrix} -3 & 5 \\ -4 & -2 \end{pmatrix}$

C. $\frac{1}{26} \begin{pmatrix} 3 & 4 \\ -5 & 2 \end{pmatrix}$

D. $\frac{1}{26^2} \begin{pmatrix} 3 & 4 \\ -5 & 2 \end{pmatrix}$

3. The determinant of $\begin{pmatrix} -3 & -5 \\ 6 & 4 \end{pmatrix}$ is equal to

A. 18

B. -42

C. 42

D. -18

4. If $A = \begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$ $B = \begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}$, find AB .

A. $\begin{pmatrix} 3 & 2 \\ 5 & 7 \end{pmatrix}$

B. $\begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$

C. $\begin{pmatrix} 2 & 1 \\ 6 & 12 \end{pmatrix}$

D. $\begin{pmatrix} 4 & 5 \\ 11 & 15 \end{pmatrix}$

5. Let $U = \begin{pmatrix} 2 \\ 5 \\ 3 \end{pmatrix}$ and $V = \begin{pmatrix} 6 \\ 4 \\ 8 \end{pmatrix}$, then $2U + \frac{1}{2}V$ is:

A. $\begin{pmatrix} 7 \\ 12 \\ 10 \end{pmatrix}$

B. $\begin{pmatrix} 8 \\ 9 \\ 11 \end{pmatrix}$

C. $\begin{pmatrix} 5 \\ 7 \\ 7 \end{pmatrix}$

D. $\begin{pmatrix} 4 \\ -1 \\ -5 \end{pmatrix}$

6. What is the value of m that makes this matrix $\begin{bmatrix} 3 & 2 \\ 6 & m \end{bmatrix}$ to be a singular matrix?

A. -4

B. -3

C. 4 .

D. 3

7. If $R = \begin{pmatrix} 2 & -1 & 0 \\ 3 & 5 & 2 \end{pmatrix}$ and $Q = \begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix}$

A. $\begin{pmatrix} 4 \\ 21 \end{pmatrix}$

B. $\begin{pmatrix} -4 & 17 & 2 \end{pmatrix}$

C. $\begin{pmatrix} 5 & 1 & 1 \\ 6 & 7 & 3 \end{pmatrix}$

D. $\begin{pmatrix} 12 \\ -3 \end{pmatrix}$

8. The determinant of the matrix $\begin{pmatrix} 4 & 3 \\ -8 & -5 \end{pmatrix}$ is

A. - 4

B. 4

C. - 44

D. 44

9. The inverse of the matrix $\begin{pmatrix} 3 & 5 \\ 2 & 4 \end{pmatrix}$ is

A. $\begin{pmatrix} -3 & 2.5 \\ 5 & -4 \end{pmatrix}$

B. $\begin{pmatrix} 4 & -5 \\ -2 & 3 \end{pmatrix}$

C. $\begin{pmatrix} 2 & -2.5 \\ -1 & 1.5 \end{pmatrix}$

D. $\begin{pmatrix} 2 & 5 \\ -1 & -3 \end{pmatrix}$

10. The determinant of a matrix $\begin{pmatrix} 0 & 1 \\ 3 & -1 \end{pmatrix}$ is
- A. -3
B. -1
C. -3
D. 0
11. If $a = \begin{pmatrix} 1 \\ 3 \end{pmatrix}, b = \begin{pmatrix} 4 \\ 2 \end{pmatrix}, c = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$, the value of $3a - 4b + 5c$ is
- A. $\begin{pmatrix} 8 \\ 9 \end{pmatrix}$
B. $\begin{pmatrix} -8 \\ -9 \end{pmatrix}$
C. $\begin{pmatrix} 24 \\ 9 \end{pmatrix}$
D. $\begin{pmatrix} -13 \\ 1 \end{pmatrix}$
12. If $a = \begin{pmatrix} 2 \\ 4 \end{pmatrix}, b = \begin{pmatrix} 3 \\ 5 \end{pmatrix}, c = \begin{pmatrix} 6 \\ 7 \end{pmatrix}$, then $a + 2b + c$ equals
- A. $\begin{pmatrix} 12 \\ 16 \end{pmatrix}$
B. $\begin{pmatrix} 9 \\ 12 \end{pmatrix}$
C. $\begin{pmatrix} 14 \\ 21 \end{pmatrix}$
D. $\begin{pmatrix} 13 \\ 14 \end{pmatrix}$

4.2. Structured questions

1. If $\mathbf{P} = \begin{pmatrix} 3 & 1 \\ 4 & 2 \end{pmatrix}$ and $\mathbf{Q} = \begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}$, evaluate :

i) $\mathbf{R}$, given $\mathbf{R} = \mathbf{P} + 2\mathbf{Q}$

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$\mathbf{R}^{-1}$ (the inverse of $\mathbf{R}$)

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Given the matrix

$\mathbf{M} = \begin{pmatrix} 3 & -5 \\ 5 & 2 \end{pmatrix}$ find the inverse of $\mathbf{M}$ and hence or

otherwise, solve the simultaneous equation $3x - 5y = -9$

$$5x + 2y = 16$$

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Given the matrices $A = \begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -2 \\ -2 & 5 \end{bmatrix}$ and that $C = AB$, find the matrix C

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Evaluate (a) $\begin{pmatrix} -2 & 3 \end{pmatrix} \begin{pmatrix} 4 \\ 5 \end{pmatrix}$

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2. Find the matrix M such that $2M - \begin{pmatrix} 0 & 4 \\ -6 & 8 \end{pmatrix} = 3 \begin{pmatrix} 2 & 0 \\ 0 & -4 \end{pmatrix}$

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Use the following matrices:

$$A = \begin{pmatrix} 3 & -4 & 2 \\ 1 & -6 & 8 \\ -5 & 1 & 2 \end{pmatrix} \quad B = \begin{pmatrix} 9 & -1 \\ 11 & 1 \\ 4 & -3 \end{pmatrix} \quad C = \begin{pmatrix} 8 & -7 \\ 3 & 4 \end{pmatrix}$$

a) Find AB .

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b) Find C^{-1} , the inverse of C .

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c) Solve for the value of the variables **p**, **m** and **t** in the following equation.

$$\begin{pmatrix} p & 8 \\ 2 & 6 \end{pmatrix} + \begin{pmatrix} -3 & 6 \\ 4 & m \end{pmatrix} = \begin{pmatrix} 1 & t \\ 6 & 8 \end{pmatrix}$$

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Chapter 5: numbers

5.1. Multiple choices

1. The difference between the largest and the smallest of the fractions

$\frac{5}{9}, \frac{6}{11}$ and $\frac{8}{15}$ is

A. $\frac{1}{2}$

B. $\frac{1}{45}$

C. $\frac{1}{99}$

D. $\frac{2}{165}$

2. Express 0.00007425 in standard form.

A. 7.425×10^5

B. 0.7425×10^{-4}

C. 74.25×10^{-6}

D. 7.425×10^{-5}

3. Evaluate $\frac{-21 \div (-7) \times 3 - (-5)}{-4 \times 4 \div 2 + 1}$

A. 14

B. -7

C. -2

D. 2

4. What is the value of $300 \div 6 + 4 \times 2$:

A. 21.4

B. 25

C. 30

D. 58

5. Evaluating $8\frac{2}{3}$, we get

A. -8

B. 4

C. 8

D. 16

6. What is the value of the expression $360 \div (10 \times 6)$?

A. 4

B. 9

C. 6

D. 216

7. What is the value of the expression below?

$$\frac{15(4 + 8)}{2(2 + 1) - 1}$$

A. 17

B. 36

C. 45

D. 60

8. Deeqa made a snack mix using the ingredients listed below. What is the total amount of all four ingredients?

$1\frac{1}{4}$ cups granola	$\frac{3}{4}$ cup peanuts
$\frac{1}{2}$ cup raisins	$\frac{1}{4}$ cup chocolate chips

- A. $1\frac{3}{4}$ cups B. $2\frac{1}{4}$ cups
C. $2\frac{1}{2}$ cups D. $2\frac{3}{4}$ cups

9. $\frac{3}{14} \times \frac{7}{27} \times \frac{18}{35}$ is equal to:

- A. $\frac{3}{35}$
B. $\frac{1}{35}$
C. $\frac{1}{45}$
D. $\frac{1}{15}$

10. The greatest common divisor (GCD) of 144 and 120 is

- A. 4
B. 6
C. 12
D. 24

11. The LCM of 6, 12, 18 is:

- A. 18
B. 6
C. 24
D. 36

12. $9.36 \div 0.4$ is
- A. 234
 - B. 23.4
 - C. 0.234
 - D. 2.34
13. $7\frac{15}{16} - \frac{3}{10}$ equals:
- A. $6\frac{51}{80}$
 - B. $7\frac{51}{80}$
 - C. $8\frac{19}{80}$
 - D. $7\frac{19}{80}$
14. 0.3075 corrected to 2 significant figures is
- A. 0.40
 - B. 0.31
 - C. 0.30
 - D. 0.3
15. 45 rounded off to the nearest 100 is
- A. 45
 - B. 100
 - C. 50
 - D. 0

16. The approximate value of $\frac{3.96 \times (0.5)^2}{97.1}$ is

A	0.01	B	0.02
C	0.04	D	0.1

17. 0.020495 corrected to three significant figures is

- A. 0.02
- B. 0.020
- C. 0.02029
- D. 0.0205

18. $\frac{9}{16}$ correct to two decimal places is

- A. 0.56
- B. 0.50
- C. 0.506
- D. 0.5062

19. The weight of a bus is given as 4527. Approximate this weight to one significant figure.

- A. 4500
- B. 4530
- C. 4600
- D. 5000

5.2. Structured questions

1. Work out $5\frac{1}{5} - 1\frac{2}{3}$

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2. Simplify $\frac{9a - 15}{9a^2 - 25}$

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Give the Upper and Lower bound of 2.

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3. Express 0.245 6

i. correct to 2 significant figures

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ii. Correct to 1 decimal place.

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4. Write each of the following in standard form

i. 457 170 000

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ii. 0.00 000 000 656

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Chapter 6: Distance, speed and time

6.1. Multiple choices

1. A car is traveling at 90 km / h. How far will the car travel in 10 minutes?

A	9 km	B	10
C	$3\frac{1}{2}$ km	D	15 km

2. C

calculate the time taken for a bullet to travel 8 km at a speed of 5 000 m/s.

A	1.8 s	B	4 s
C	1.6 s	D	2 s

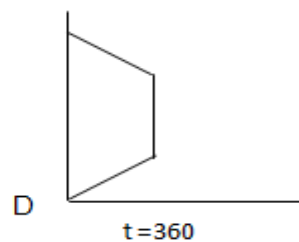
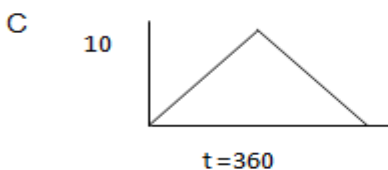
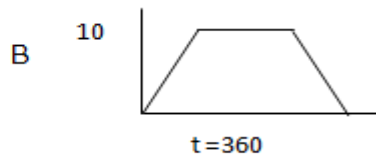
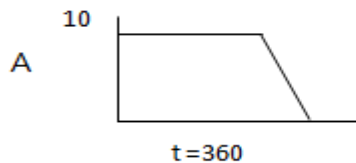
3. A bus which consumes 1 litre of diesel for every 9 km uses 108 litres of diesel for a journey. Find how many litres of diesel a trailer which consumes 1 litre of diesel for every 6 km uses for the same journey.

A	72	B	54
C	18	D	162

4. A girl moves 2 units to the left of zero followed by 5 units to the right.
The final position of the girl is

A	- 5	B	7
C	- 7	D	3

5. A bus travels from rest at HargeisaEgal airport and steadily increases speed to 10 m/s. It travels at this speed for 240s before coming to rest at Hargeisa town centre. The total time is 360s. The appropriate speed-time sketch is



6. Expressed in kilogrammes, 3kg 21g is

- A. 3021
- B. 321
- C. 3.21
- D. 3.021

7. Zainab walks the x km to school at 5 km/h and runs home at 8 km/h taking 8 minutes less. Then x satisfies the equation

A. $8x - 5x = 8$

B. $8x - 5x = \frac{2}{15}$

C. $\frac{x}{5} - \frac{x}{8} = 8$

D. $\frac{x}{5} - \frac{x}{8} = \frac{2}{15}$

8. A bicycle travels 7200km in 30 minutes. Find the speed of the bicycle in km/sec.

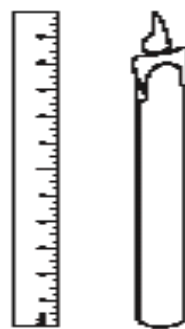
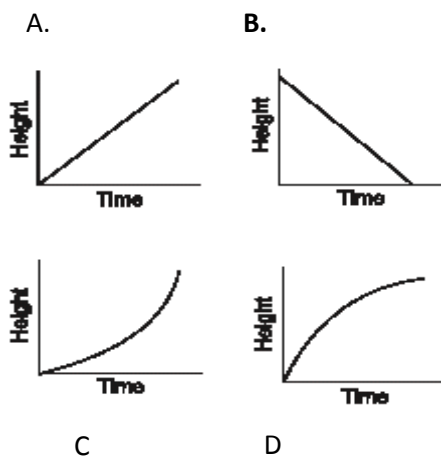
A. 24 km/s

B. 4 km/s

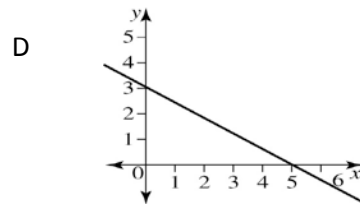
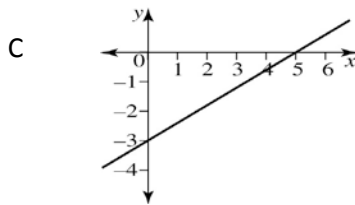
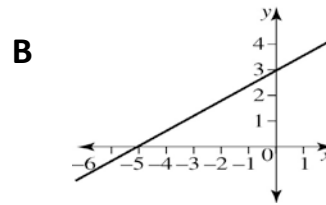
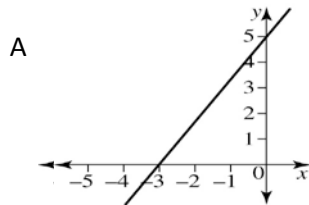
C. 240 km/s

D. 40 km/s

9. Asha is observing how the height of a tall thin cylindrical candle changes over time as it burns. Which graph best represents the changes in the height of the candle over time?



10. The graph of $-3x + 5y = 15$ is best represented by:

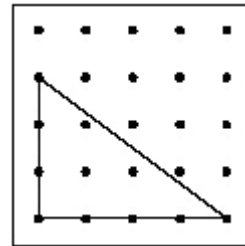


11. Mr. Indhamood is planning to drive 135 km from Borama to Hargeisa airport. He estimates that he will average 55 km per hour. What is the latest time he can leave Borama to arrive in Hargeisa airport at 11:00 A.M.?
- A. 9:30 A.M.
 - B. 8:30 A.M.
 - C. 7:30 A.M.
 - D. 6:30 A.M.

12.

On the given grid, the distance between each dot is 1 cm. What is the length, in cm, of the hypotenuse of the right triangle?

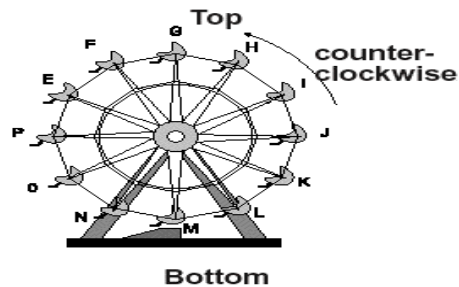
- A. 4
- B. 4.5
- C. 5
- D. 5.5



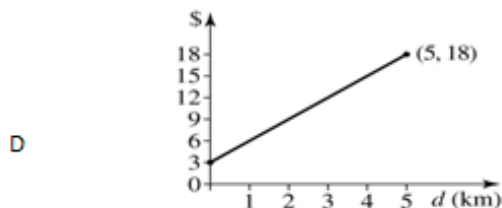
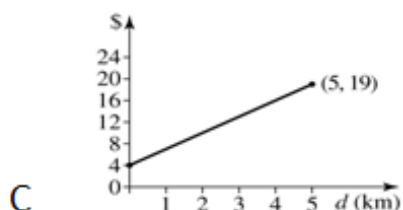
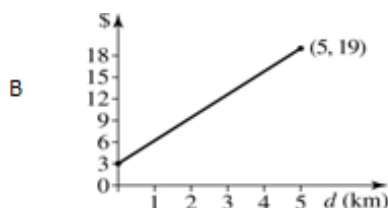
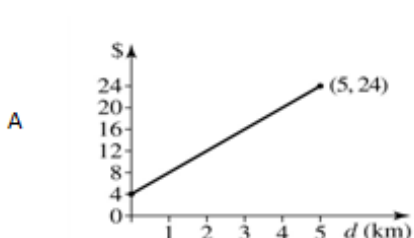
C

13. The spokes on the Ferris wheel are evenly spaced. After $2\frac{1}{4}$ complete turns how many degrees will car M have travelled?

- A. 90°
- B. 225°
- C. 450°
- D. 810°

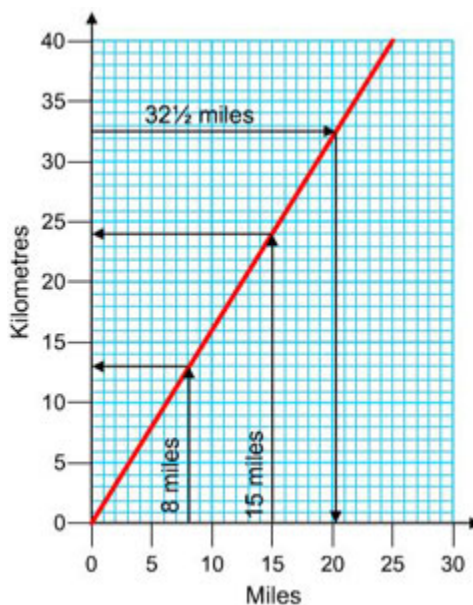


14. During a fundraising walk, Suad receives \$4 plus \$3 per kilometre. The graph which best represents Suad walking up to 5 kilometres is:



15. Use the conversion graph to convert 10 miles to kilometres

- A. 16.2 km
B. 22.4 km
C. 19 km
D. 10 km



6.2. Structured questions

1. The graph shows the journey of a cyclist traveling from home to school and back.

Distance in km



- a) What was the speed of the cyclist

- i) In the first hour?

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- ii) on his return journey

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b) Calculate the average speed of the cyclist for the whole journey.

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2. A motorist traveled the first 90 km at an average speed of 60 km / h and for the next $3\frac{1}{2}$ hours he travelled at an average speed of 80 km / h. Find the average speed for the whole journey.

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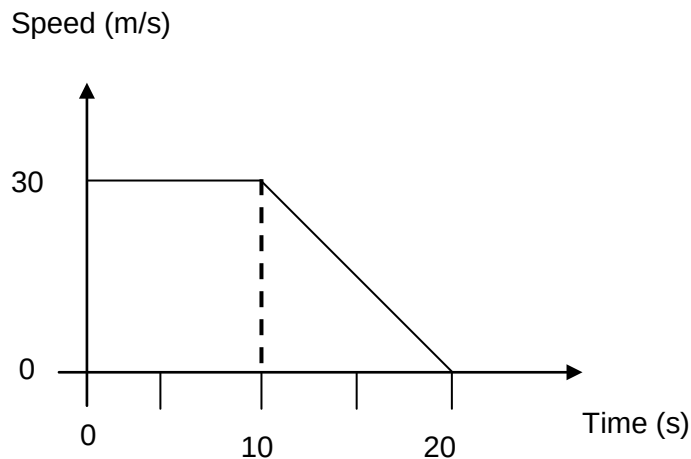
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3. The diagram shows the speed –time graph of a car.



Calculate

a) the total distance travelled in 20 seconds

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b) the distance travelled at constant speed

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c) the distance travelled in the last 10 seconds

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he retardation in the last 10 seconds

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Mohamed's average driving speed for a 4-hour journey trip was 45 kilometres per hour. During the first 3 hours he drove 40 kilometres per hour. What was his average speed for the last hour of his trip?

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Chapter 7: Ratio, proportion and percentage

7.1. Multiple choices

1. $a : b = 1 : 2$ and $b : c = 3 : 5$ therefore $a : c$ is
 A. $3 : 10$
 B. $1 : 3$
 C. $4 : 7$
 D. $3 : 1$
2. A floor is covered by 600 tiles of size 10 cm by 10 cm. How many 20 cm by 20 cm tiles are needed to cover the same floor?

A	150	B	300
C	450	D	500

3. A trader sold an article at 15 % discount to a customer who paid \$ 510 for it. What was the marked price of the article?

A	\$ 550	B	\$ 580
C	\$ 600	D	\$ 615

4. How many cubes of edge 3 cm are needed to fill a box with internal dimensions 12 cm by 6 cm by 6 cm?

A	8	B	18
5. D C i	24	D	16

vide 30m in the ratio 2:3

A	6:9	B	9:6
C	12:18	D	18:12

6. A town water company charges \$ 6 for the first 4000 litres of water used, \$ 4 for the next 4000 litres and \$ 3 for each succeeding 4000 litres(or part of it). The charge for 14 000 litres is
- A. \$ 13
 - B. \$ 14
 - C. \$ 14.5
 - D. \$ 16
7. A shopkeeper increases the price of cooking fat by 20% to \$14.40. The original price was
- A. \$ 11.50
 - B. \$ 12.00
 - C. 12.40
 - D. \$ 14.20
8. The ratio of the weights of two girls is 4:5. If the lighter one weighs 44kg, what does the heavier one weigh?
- A. 55 kg
 - B. 35.2 kg
 - C. 99 kg
 - D. 23.4 kg

9. The scale of a map is 1:2000 000. Calculate the actual distance in km between two points A and B, 5cm apart on the map.
- A. 10
 - B. 1000
 - C. 100
 - D. 20
10. A small car is bought, second hand, for £ 560. Each year it depreciates in value by 20 per cent of its value at the beginning of the year. After three years its value, in pounds, is
- A. $560 - 60$
 - B. $560 \times \frac{40}{100}$
 - C. $560 \times \left(\frac{100}{120}\right)^3$
 - D. $560 \times \left(\frac{80}{100}\right)^3$
11. 800 decreased by 5% is
- A. 795
 - B. 640
 - C. 760
 - D. 400
12. The price of a TV changed from \$240 to 300. What is the percentage increase?
- A. 15%

B. 20%

C. 60%

D. 25%

13. A school has 400 pupils of whom 150 are girls. The ratio of girls to boys is

A. 3:5

B. 2:3

C. 5:3

D. 5:8

14. Given $a + b = 10$ and $a - b = 4$ then $2a - 5b =$

A. 0

B. -1

C.

D. 3

15. In a form two class, the ratio of boys to girls is 6:7. If there are 18 boys in the class, the girls are

A. 21

B. 39

C. 24

D. 15

16. A farmer sells $\frac{2}{5}$ of his camels. He gives $\frac{1}{3}$ of the remainder to his son. What fraction of camels is left?

A. $\frac{3}{5}$

B. $\frac{2}{5}$

C. $\frac{4}{13}$

D. $\frac{9}{13}$

17. A trader in Borama marks his goods 20% above the cost price. He gives 10% discount to a customer and sells the goods at \$ 486. Calculate the cost price of the goods.

- A. \$ 520
B. \$ 583.20
C. \$ 534.60
D. \$ 450.

18. The price of a ring is directly proportional to its weight. If 10g ring is worth £3000, what is the weight of a ring worth £900?

- A. 11
B. 9
C. 7
D. 3.

19. The floor of a hall 16m by 12m is to be covered by square tiles of side 20cm. How many tiles are needed?

- A. 480
- B. 4800
- C. 960
- D. 9.6.

20. If y is inversely proportional to x^2 and $y = 2$ when $x = 3$,
find y when $x = \frac{1}{2}$

- A. 36
- B. 46
- C. 72
- D. 54.
- E. 150° .

21. Increase 40 by 2:1 equals:

- A. 20
- B. 80
- C. 40
- D. 60.

22. A number of sweets were divided between three children
In the ratio 1: 2: 3. if the least share were 25 sweets, how
Many sweets were there altogether?

- A. 75 sweets
- B. 125 sweets
- C. 150 sweets
- D. 250 sweets.

23. Asma paid \$160 for a TV-screen which has a marked
price

of \$200 the percentage discount would be:

- A. 10%
- B. 20%
- C. 25%
- D. 40%.

24. A greengrocer bought a bag of carrots for \$10. Later he sold it and made a profit of 40%. What is the selling price of the bag of carrots?

- A. 11
- B. 12
- C. 14
- D. 16

25. If the total tax paid at a rate of 10% on the price of an article is \$70. What was the price of the article?

- A. \$70
- B. \$630
- C. \$700
- D. \$770

26. If $y \propto x^2$, and $y = 6$ when $x = 3$. Find Y when $x = 9$?

- A. 9
- B. 27
- C. 81
- D. 54

27. The lengths of three sides of a triangle are in the ratio of 3:4:5 and the perimeter of the triangle is 48 m. The length of the longest side of the triangle is

- A. 15 m
- B. 20 m
- C. 25 m
- D. 28 m

28. 12 people can dig a trench in 6 hours.

How many hours will it take 9 people?

- A. 8
- B. 6
- C. 12
- D. 4.5

A sweater originally cost \$ 37.50. Last week,
Daud bought it at 20% off. How much was
deducted from the original price?

- A. \$7.50 B. \$ 17.50
- C. \$ 20.00 D. \$30.00



29. Ali paid \$17.5 for a shirt which has a marked price of \$20.

The percentage discount would be:

- A. 14.3%
- B. 2.5%

C. 12.5%

D. 17.5%

30. A holiday is reduced by 20% to £360. What was the original cost of the holiday?

A. £72

B. £300

C. £380

D. £450

31. A Hargeisa internet technician charges \$60 a visit plus \$80 per hour. If the bill is \$500, how long did the technician stay?

A. $5\frac{1}{4}$ hours

B. 5 hours

C. $5\frac{3}{4}$ hours

D. $5\frac{1}{2}$ hours

32. The scale of a map is 1:100 000. If the actual length of a road is 1km, how long is the road on the map?

A. 1 cm

B. 2 cm

C. 1 m

D. 1 mm

33. 5300 ml expressed in litres is

A. 0.053

B. 0.53

C. 5.3

D. 53

34. 34 are what percent of 80?

A. 34 %

B. 40 %

C. 42.5 %

D. 44.5 %

35. An electronics store is offering a discount of \$35 off the original price of a television. This discount is equal to 5% of the original price. What is the original price?

A. \$70

B. \$175

C. \$700

D. \$1750

36. If 5 people equally share the total cost of a rental car, each person will pay \$360. If 9 people equally share the same total cost of the rental car, how much will each person pay?

A. \$ 72

B. \$ 90

C. \$200

D. \$288

37. 32 % of \$ 400 is equal

A. 120

B. 126

C. 128

D. 180

38. If R is inversely proportional to A, and $R=4$ when $A=100$.

What is the value of R when $A=250$?

A. 0.625

B. 1.6

C. 10

D. 6250

7.2. Structured questions

1. If 10 Centimeters on the map represents 5 kilometers on the ground, what is the Scale of the map

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2. What is 7.5 % of Sh. 25 200?

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3. An agent of a businessman is offered a commission of 4% on all sales of goats and 7% on all sales of cattle. He sold goats worth £ 35 000 and received £ 6 300 as total commission altogether. What was the value of the sales of the cattle?

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4. Omar has to share 80 books with his younger sisters Ayan and Safia. He decides that for every 2 books that Safia gets Ayan gets 3 books and he gets 5 books. Find the number of books each gets.

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5. A businessman in Burao town bought 20 toys for \$240 dollars. He then spent \$60 on transport of all the toys to Somaliland (SL). He later sold each toy at a profit of 40%.

Given that 1 Us dollar= SL.sh.6300, calculate in SL shillings
the selling price of each toy.

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6. A map is drawn to a scale 1: 50 000. Find the

a) Distance, in km, between two places which are 20 cm
apart on the map.

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b) Area, in cm^2 , on the map of a field with an actual area of
 $125\,000\text{ m}^2$

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7. The hire purchase price of buying a lorry is 25% more than
the cash price. If the cash price is \$ 27 000, find;

a) the hire purchase price,

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- b) The monthly installment if a down payment of \$ 8 000 is made and the balance has to be cleared in 25 months.

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8. Mohamed is 5 years old, ali is 3 years old, and aysha is 2 years old their father gave them \$1000 in the ratio of their ages calculate how much each received?

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9. A farmer took 8000 chickens to the market to sell. In the first hour he sold 25% of the chickens. In the 2nd hour, he sold 30% of those that were left.

a. How many chickens did he sell in total?

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b. What percentage of the original did he sell in the two hours?

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10. In 1950, the population of Switzerland was 4714900. In 2000, the population was 7087000.

a) Work out the percentage increase in the population from 1950 to 2000.

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b)

i) Write the 1950 population correct to 3 significant figures

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ii) Write the 2000 population in standard form

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11.

a. A jumper is priced at \$35. In a sale its price is reduced by 22%. Find the sale price of the jumper.

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b. The cash price of a television is \$260. It can be bought on hire purchase by paying a deposit of 25% of the cash price and 15 installments of \$14. Find the total hire purchase price of the television.



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12. A man deposits sh.40, 000 in a bank which gives a simple interest of 3% per annum.

a. How much will he have in the bank after 5years?

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b. How much interest will he have earned in total in 5years?

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c. After how many years will the initial amount deposited double?

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13. Sand and gravel are mixed in the ratio of 5:3 to prepare 976 kgs of ballast.

i) How many kgs of sand are needed?

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ii) How many kgs of gravel are needed?

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14. By selling a radio for \$250, Muna makes a profit of 30%. Calculate the buying price.

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15. Zahra bought a dress at 20% discount. If the marked price was \$12, what was the sale price?

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16. A Hargeisa store reduces the price of a \$ 30 shirt by 20%, but later raises it again by 20% of the sale price. What is the final price of the shirt?

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17. One pipe can fill a tank in 20 minutes, while another takes 30 minutes to fill the same tank. How long would it take the two pipes together to fill the tank?

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18. Hassan and his sister are using 5-foot and 8-foot landscaping timbers to enclose a vegetable garden in Gabiley. They bought 40 timbers. The total cost for the timbers was \$281.

- a) Write down two pairs of equations for the purchase of timber.

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- b) Solve the pair of equations to find the number of timbers of each size that they bought?

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- c) If they decided to reduce 5-foots and 8-foots by 5 pieces each, how much would they pay at the Roda's Lumberyard in Gabiley?

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Chapter 8: Statistics

8.1. Multiple choices

1. For the numbers 2, 3, 9, 4, 7, 2, 1 the sum of the median and the mode is
 - A. 4
 - B. 5
 - C. 6
 - D. 7
2. The mean of four numbers is 12. The mean of three of the numbers is 13. What is the fourth number?
 - A. 18
 - B. B. 9
 - C. 16
 - D. 24
3. What is the median of the data: 2,25,8,21,3,13,7,4,9,7,11.
 - A. 13
 - B. 7
 - C. 10
 - D. 8
4. The mean of $\frac{1}{2}, \frac{1}{3}$ and $\frac{5}{12}$ is
 - A. $\frac{5}{4}$
 - B. $\frac{1}{3}$

C. $\frac{5}{12}$

D. $\frac{5}{72}$

5. If the mean mass of 5 students is 60kg. and mean mass of another 4 students is 55kg, the mean mass of the 9 students is

A. 57.78kg

B. 57.77kg

C. $\frac{520}{9}$ kg

D. 57kg.

6. Calculating the mean of following numbers 131, 121, 110, 124, 139 gives

A. 130

B. 120

C. 125

D. 110

7. Weekly wages of five workers in a certain job are \$140, \$150, \$200 \$210 and \$120. The range of the wages is :

A. \$60

B. \$50

C. \$70

D. \$90.

8. The mode of the following numbers 2, 3, 4, 5, 2, 6, is

A. 6

B. 4

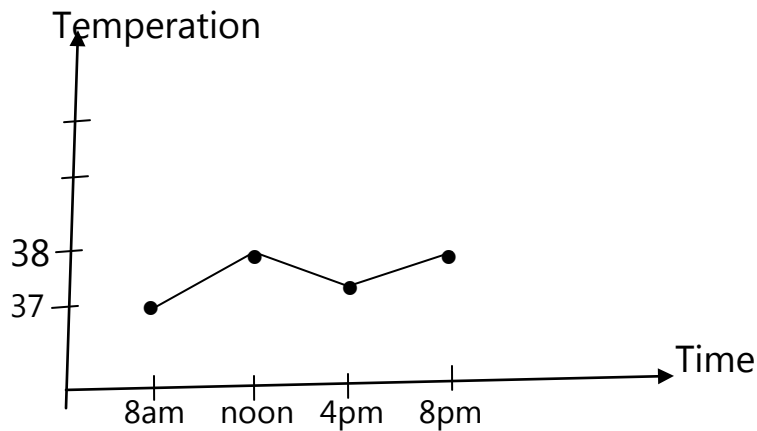
C. 5

D. 2

9. The weekly payment of 4 whole seller workers are \$150.6, \$185, \$205, and \$250, the range of these payments is:

A. 99.4
B. 150
C. 65
D. 45

10. The graph shows Roda's temperature for the first 12 hours in a hospital. What happened Rooda between noon and 4pm?



- a) her temperature increased
b) her temperature did not change
c) her temperature was above 38⁰c
d) her temperature decreased
11. the sum of the mean and mode of data 4, 2, 4, 1, 4, is
- A. 4
B. 7
C. 5
D. 1

12. The median and the mode of the heights of 15 trees.

3,4,3,5,5,4,4,6,7, 8,6,5,9,5,7 are respectively:

A. 6,5

B. 5,6

C. 5,5

D. 4,5

13. Mr. Guleid took a survey in which he asked each of the 30 students in his math class to choose his or her favorite food. He tallied the results in this chart. Mr. Guleid wants to construct a circle graph for this data. What should be the measure of the angle for the section of the graph for hamburgers?

Favorite Food

Food	Number of Students Choosing Food
Tacos	I
Pizza	
French Fries	
Hot Dogs	
Hamburgers	

A. 40°

B. 56°

C. 120°

D. 96°

14. The median of the data 0. -1, 2, -5, 9, 6, 4, 1, -8, is

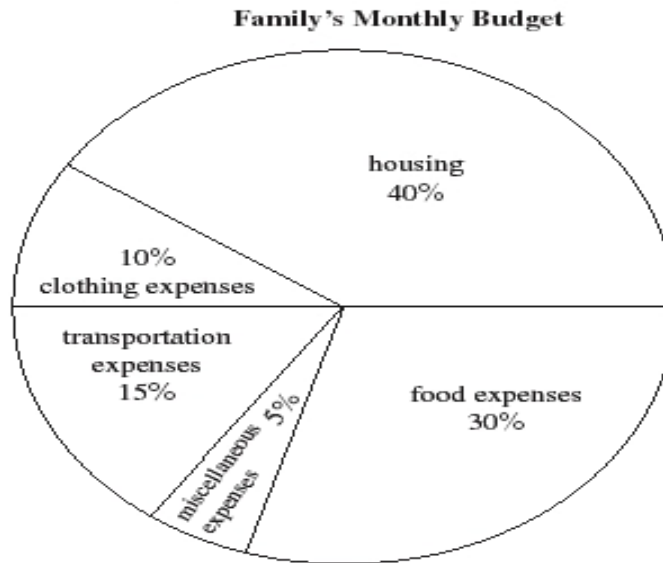
A. 9

B. 2

C. 1

D. $\frac{8}{9}$

15. The circle graph below shows the Saed's family's monthly budget. The Saedfamily has a total monthly income of \$2,000.



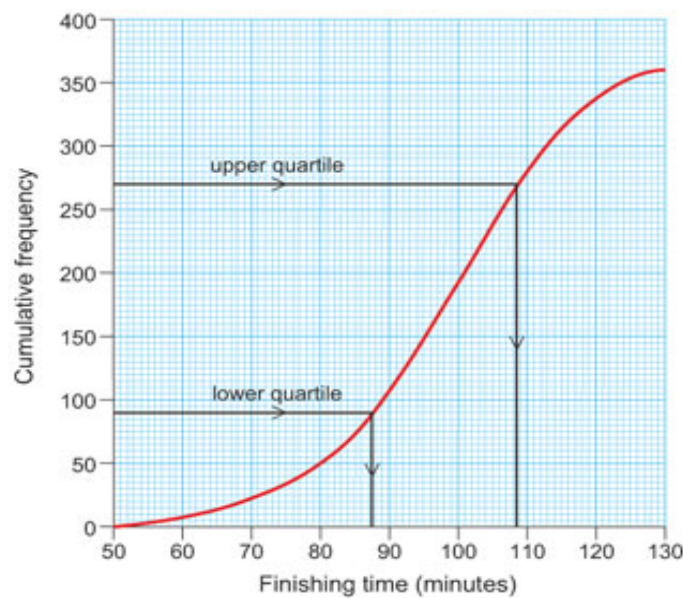
Mr. Saed received a \$100 per month raise. He increased the transportation expense portion of the monthly budget by \$100.

To the nearest percent, what portion of the saed's income is now being spent on transportation expenses?

- A. 14 %
 - B. 19 %
 - C. 20 %
 - D. 21 %
16. Six students are participating in a fitness program. They are required to work out in pairs. How many different combinations of pairs of students are possible?

- A. 3
- B. 5
- C. 15
- D. 30

17. The finishing times of people in a sponsored run are recorded.
Use the cumulative frequency graph to find the interquartile range.



- A. 2.1 mins
 - B. 22 mins
 - C. 20 mins
 - D. 21 mins
18. What is the median of the numbers 12, 23, 10, 8, 22, 14, 30, 18
- A. 15
 - B. 16
 - C. 8
 - D. 22

19. The number of minutes that Dr. Habiba's patients spent in the waiting room one day is listed in the box below.

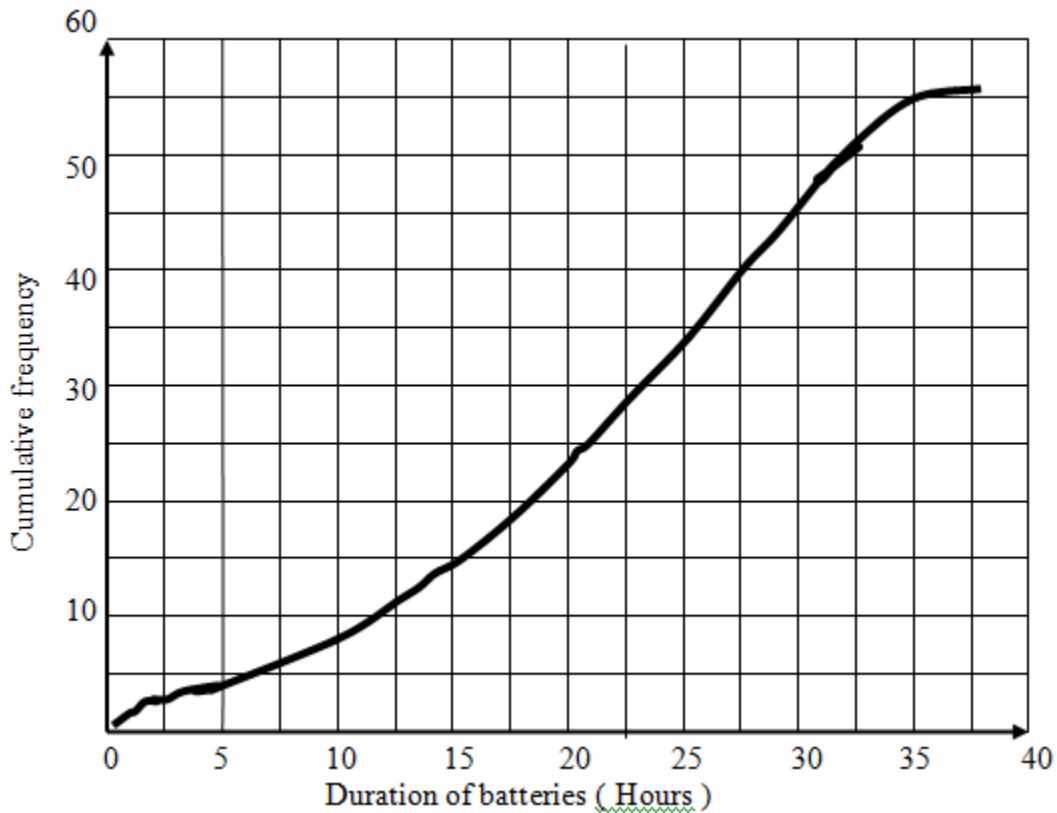
4, 22, 3, 15, 6, 12, 8, 5, 20, 6, 9

What is the MEDIAN number of minutes the patients spent in the waiting room?

- A. 6
 - B. 8
 - C. 10
 - D. 12
20. The average of six numbers is 4. If the average of two of those numbers is 2, what is the average of the other four numbers?
- A. 5
 - B. 6
 - C. 7
 - D. 8
21. The mean of the numbers 2, 3, 4, 5, 6, x is 5. Find the value of x .
- A. 4
 - B. 5
 - C. 10
 - D. 20

8.2. Structured questions

1. The following frequency curve records the duration of batteries.



i) Show on the graph the estimated Lower Quartile (LQ) and Upper Quartile (UQ)

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ii) Calculate the median and Interquatile range and mark them on the graph

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2.The data below shows the times taken by 30 athletes who took part in 400 metre heats during a school sports day.

Time in Seconds	Number of Athletes	
30 – 34	1	
35 - 39	6	
40 - 44	10	
45 - 49	8	
50 - 54	3	
55 - 59	2	

i) State the modal class of their times

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ii) Calculate the mean time

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3. The table shows the scores of 30 pupils.

Score	1	2	3	4	5
Frequency	3	4	2	2	X
Cumulative frequency	3	7	9	11	Y

a) State the values of x and y

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.....
.....

b) State the mode

.....

c) Calculate the mean score

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4. The table shows the masses to the nearest kilogram of 40 students in a form one class.

Class	Class Mid-point	No. of students	
Mass(kg)	X	Frequency(F)	F x
33-37	35	4	
38-42		10	
43-47		16	
48-52		8	
53-57		2	

- Fill in the mid-points
- Calculate the values of Fx
- Calculate the mean mass of the students.

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5. The table shows the number of pupils in a class who scored marks 3 to 8 in a Mathematics test. Find the:

Marks	3	4	5	6	7	8
Number of pupils	2	3	6	4	3	2

- a) mean mark

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- b) modal mark

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- c) median mark

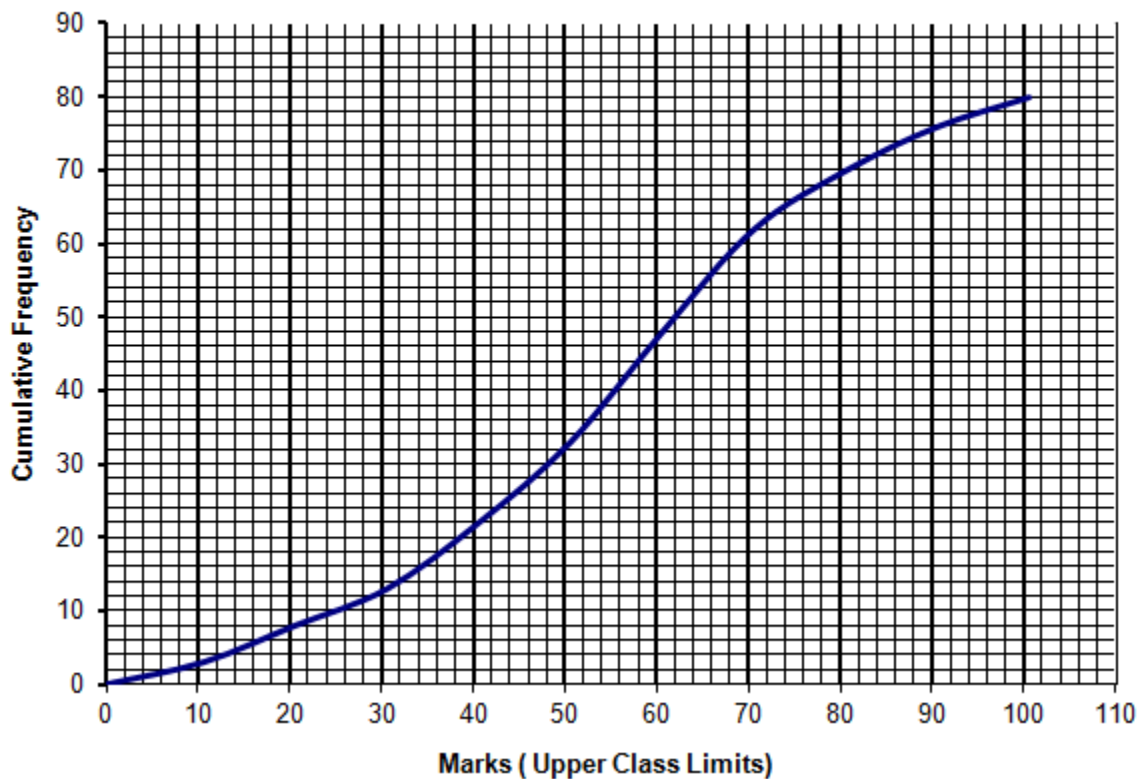
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6. The diagram below shows the cumulative frequency graph for the marks obtained by 80 Form four students in a Mathematics test marked out of 100%.

Cumulative Frequency Curve



Use the graph to find;

a) the median mark

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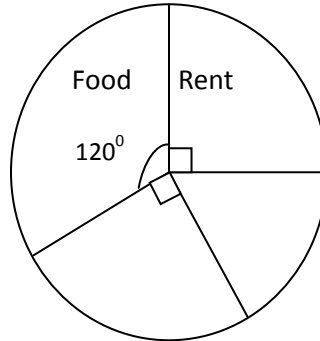
b) the inter-quartile range

.....

c) the pass mark if 80% of the pupils are to be successful

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7. The pie-chart illustrates how a man spends his wages each month. He pays \$810 for rent each month.



- a) What fraction of his wage is spent on food?

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- b) What percentage of his wages is spent on bus?

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- c) What is his monthly wage?

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8. The daily wages of 30 labourers at a farm are shown in the table below.

Wages in \$	Frequency		
30-34	1		
35-39	6		
40-44	10		
45-49	8		
50-54	2		
55-59	3		

a) State the modal class

.....

b) By adding the necessary information on the table, calculate the mean daily wage.

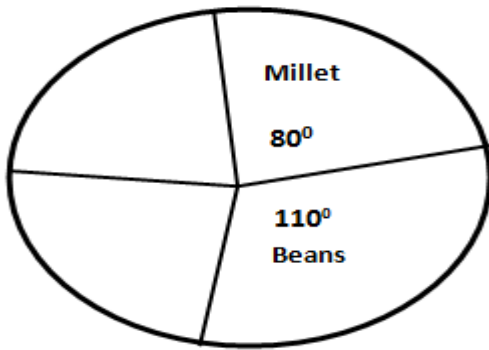
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9. A farmer divides his farm as shown in the pie chart the area of the land used for millet is 4 hector?



- a) Calculate the total area of the land

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- b) Calculate the area in hector used for beans?

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10. The marks of a mathematics test in a class of 30 students
are as

follows: 7, 7, 7, 6, 6, 6, 6, 4, 4, 4, 4, 3, 3, 3, 0, 1, 1, 2, 2, 2, 5, 5, 5, 5, 5, 8, 8, 8, 9, 10

Find the

a) mean

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b) median

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c) mode

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11. Describe and compare the following two data (using range, IQR and spread

a. 20,20,21,21,22,22,23,23,24,24.

b. 8,11,13,15,18,26,29,31,33,36.

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12. for the five items, 2, 3, 5, 7, 8 find

a) The mean value ($\bar{x}$)

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b) The standard deviation (use : $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n}}$)

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13. Fifty students take part in a quiz. The table shows the results

Number of correct answers	5	6	7	8	9	10	11	12
Number of students	4	7	8	7	10	6	5	3

a) How many students had 6 correct answers?

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b) How many students had less than 11 correct answers?

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c) Find:

i) The modal number of correct answers.

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ii) The median number of correct answers.

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iii) The mean number of correct answers

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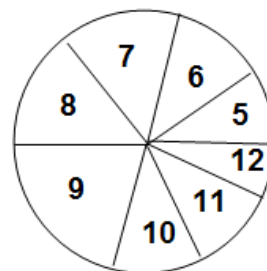
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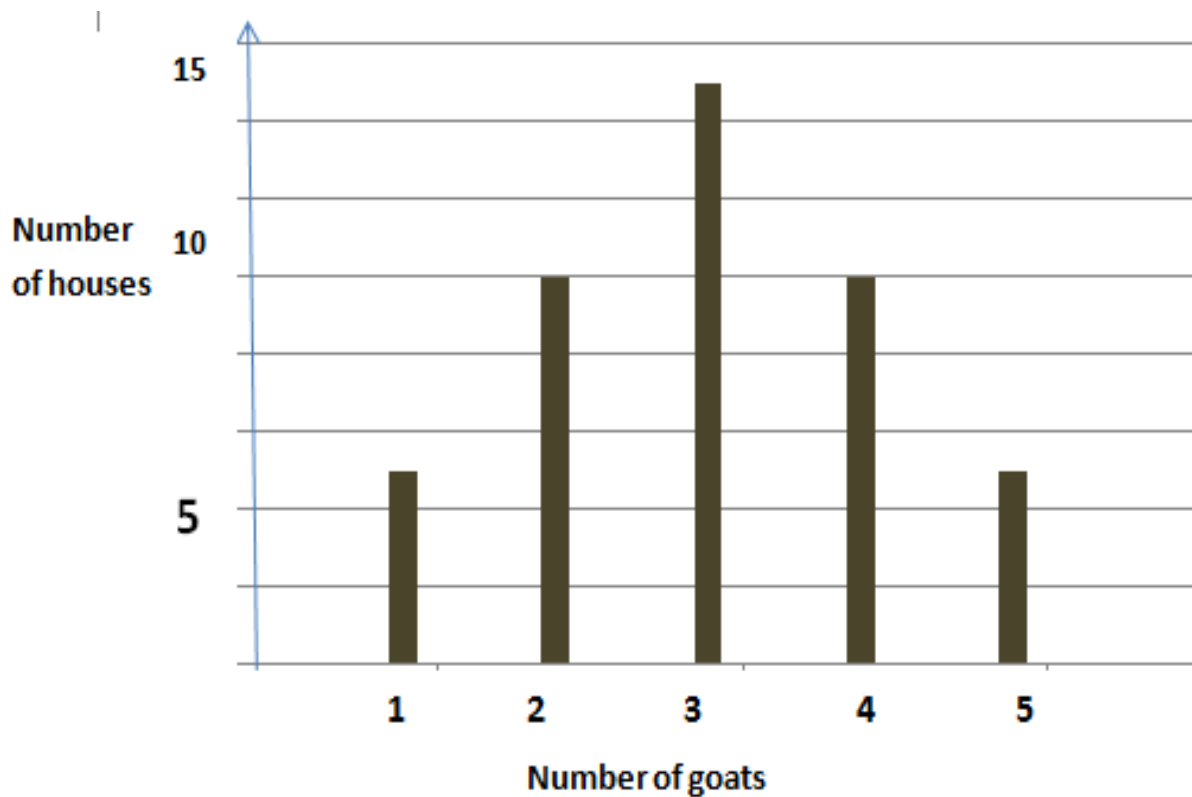
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- d) A pie chart is drawn to show the results. What is the angle for the number of students who had 11 correct answers?

.....



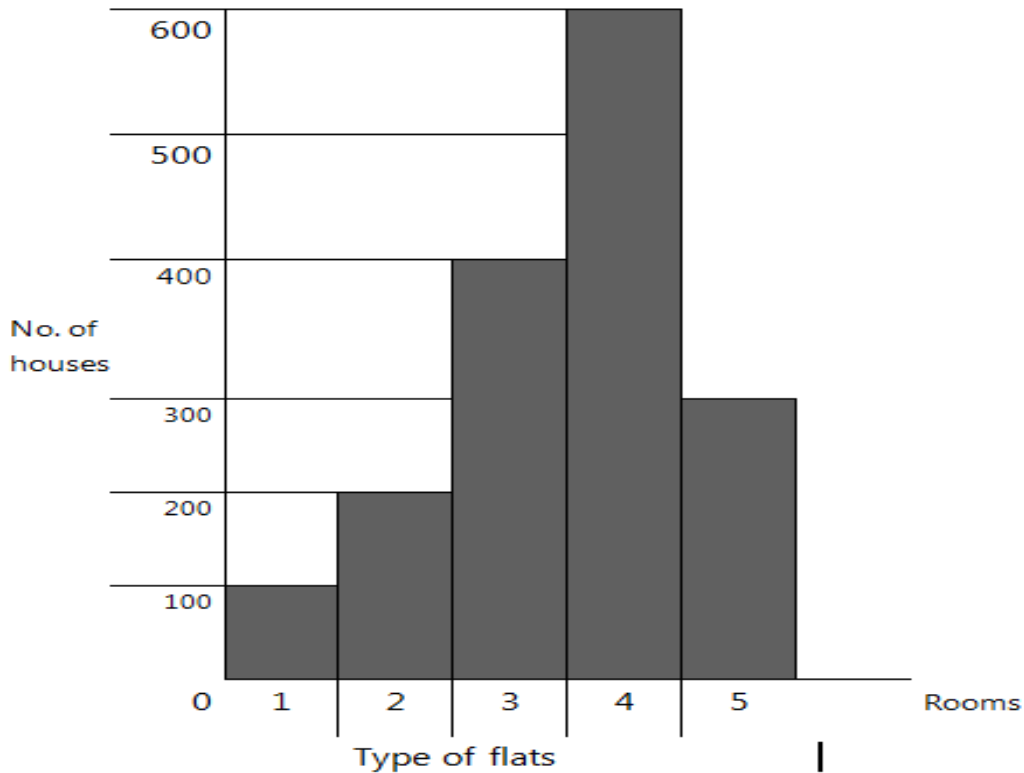
14. The bar chart shows a survey carried out on the number of goats in Gabiley town



- a) Calculate the total number of houses
 b) Calculate the total number of goats

c) Calculate the mean number of goats

15. The histogram illustrates the number of each type of flats in Burao housing estate.



a) State the modal type of flat

.....

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b) Calculate the total number of flats

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c) Calculate the mean number of rooms

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16. The masses (in kg) of 50 boys are recorded in the table below.

Mass in kg	Class mark	No.of boys (f)	Fx
40-44	42	3	126
45-49	47	9	
50-54		21	
55-59		13	
60-64		4	
	Total	50	

a) Complete the table

b) State the modal class

.....
.....

c) Calculate the mean mass.

17. The lowest temperatures recorded in a town each night for a week are. 7°C , -4°C , 3°C , 1°C , -2°C , 0°C , -1°C

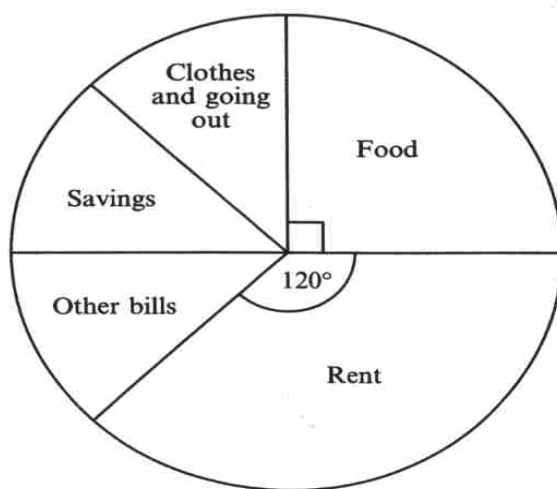
i) Write down the temperatures in order. Start with the lowest temperature

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ii) Work out the difference between the highest and lowest temperatures

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18. The pie chart shows how Abdi spends his monthly income.



Abdi spends \$150 a month on food.

i) Work out Abdi's monthly income

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.....

ii) Work out how much rent Abdi pays each month

.....
.....

19. The height (in cm) of 50 students were measured and recorded as follows.

Height (in cm)	Class mark (x)	Frequency (f)	Fx
150-154	152	3	456
155-159		11	
160-164		14	
165-169		10	1670
170-174		8	
175-179	177	4	
	Total	50	

a) Complete the table

b) State the modal class

.....
.....

c) Calculate the mean height.

.....

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20. The following information gives the heights of 15 plants
grown in Borama:



13cm, 36cm, 15cm, 13cm, 21cm, 18cm,
37cm, 18cm, 12cm, 21cm, 18cm, 20cm, 6cm,
37cm, 39cm.

i. Find the range.

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ii. Calculate the mean

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iii. Find the mode

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iv. Find the median

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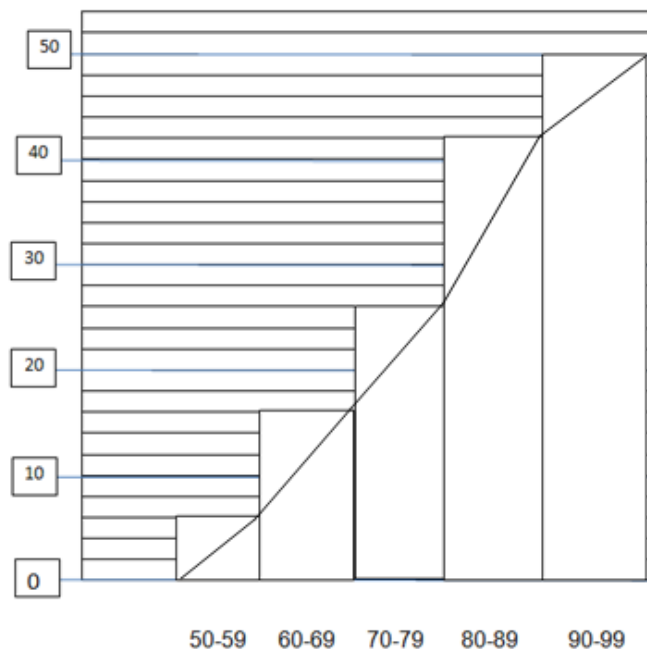
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21..Abdilahi recorded the weights of a random sample of male students in his year. The cumulative frequency graph displays the results



(i). How many of the students surveyed were in the 80-89 kg class?

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(ii) Estimate the median weight of the students surveyed.

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Chapter 9: Probability

9.1. Multiple choices

1. The probability of getting a sum of 12 with one throw of two dice is

- A. $\frac{2}{36}$
- B. $\frac{3}{36}$
- C. $\frac{1}{36}$
- D. $\frac{1}{6}$

2. Two dice numbered 1 to 6 are thrown together and their scores are added. The probability that the sum will be 11 is

A	$\frac{1}{6}$	B	$\frac{1}{12}$
C	$\frac{1}{36}$	D	$\frac{1}{18}$

3. Given $4!$ means 4 factorial, evaluate $(4! - 1)$

A	23	B	24
C	25	D	22

4. If a letter is chosen from the word "NEEDLEWORK", what is the probability that it will be the letter E?

- A. $\frac{2}{10}$
- B. $\frac{4}{10}$

C. $\frac{5}{10}$

D. $\frac{3}{10}$

5. In a class of 30 girls and 25 boys, a prefect is to be elected. What is the probability that it will be a girl?

A. $\frac{2}{5}$

B. $\frac{5}{6}$

C. $\frac{6}{5}$

D. $\frac{6}{11}$

6. In how ways can 7 boys be seated around a circular table?

A. $7!$

B. $6!$

C. $5!$

D. $8!$

7. A box contains 5 red, 4 blue and 6 white marbles. Two marbles are drawn without replacement. What is the probability of getting two white marbles?

A. $\frac{4}{25}$

B. $\frac{11}{30}$

C. $\frac{3}{21}$

D. $\frac{4}{5}$

8. A spinner is split into quarters, what is the probability of getting dark and grey?

- A. $\frac{1}{4}$
- B. $\frac{3}{4}$
- C. $\frac{1}{16}$
- D. $\frac{1}{2}$



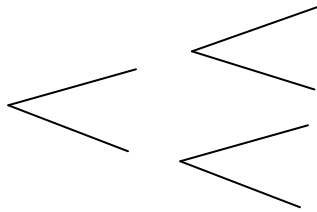
9. How many permutations can be formed from the letters in the word:
LESSON

- A. 720 ways
- B. 360 ways
- C. 120 ways
- D. 30 ways.

10. when Asha tosses two coins together, the probability she get two heads is :

- A. $\frac{1}{4}$
- B. $\frac{1}{2}$
- C. $\frac{3}{4}$
- D. 3

11. the binomial of $(1 + 3y)^4$, the third term is
- A. $12y$
 - B. $54y^2$
 - C. $81y^2$
 - D. $108y^2$
12. Two dice are thrown at the same time what is the probability of getting 5 on the first die and 3 on the second die:
- A. $\frac{1}{36}$
 - B. $\frac{1}{6}$
 - C. $\frac{5}{12}$
 - D. $\frac{5}{36}$
13. In a group of 20 girls, 5 cannot swim. If two girls are selected at random, what is the probability that both of them cannot swim?



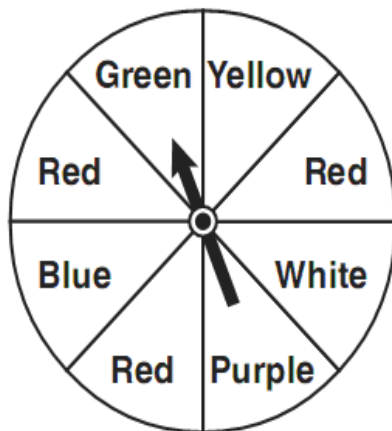
- A. $\frac{5}{20} \times \frac{15}{19}$
- B. $\frac{15}{20} \times \frac{14}{19}$
- C. $\frac{15}{20} \times \frac{5}{19}$
- D. $\frac{5}{20} \times \frac{4}{19}$

14. A bag contains 2 blue, 6 black, and 4 white socks. Hodhan is going to draw out a sock without looking in the bag. What is the probability that she will draw either a blue or a black sock?
- A. $\frac{1}{6}$
B. $\frac{1}{3}$
C. $\frac{1}{2}$
D. $\frac{2}{3}$
15. If a student is selected at random in a form 4 class, the probability that the student was born on a Friday is
- A. $\frac{1}{30}$
B. 1
C. $\frac{2}{15}$
D. $\frac{1}{7}$
16. In how many different ways can a chairperson and secretary be selected from a committee of 9 people?
- A. 36
B. 24
C. 72
D. 12
17. In a class of 20 girls and 15 boys, if a monitor is to be chosen, the probability that it will be a girl is
- A. $\frac{3}{4}$
B. $\frac{4}{7}$

C. $\frac{3}{7}$

D. $\frac{5}{8}$

18. The spinner below is divided into eight equal regions and is spun once. What is the probability of NOT getting a red?



A. $\frac{3}{5}$

B. $\frac{3}{8}$

C. $\frac{5}{8}$

D. $\frac{7}{8}$

9.2. Structured questions

1. The results of two dice thrown are shown in the following table:

Second Dice

First
Dice

X	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

a) What is the probability of a total of 5 or a total of 7?

.....

b) Find the probability of getting same number on both dice or a total of 6?

.....

c) Find the probability of at least a total of 8?

.....

2.

a) In how many ways can 3 boys and 2 girls be selected from a group of 5 boys and 4 girls?

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b) In how many possible ways can the letters of the word SUCCESS be permuted?

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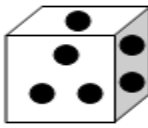
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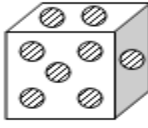
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3. Two fair dice are rolled and the sum of all possible scores recorded in the following table.

Dice 1



Dice 2



+	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

a) Fill in the table with the sum of all possible scores of dice 1 and dice 2

b) What is the probability of:

i) a total score of 11

.....

ii) an even sum

.....

iii) a number greater than 8

.....

iv) a total which is a multiple of 2 or 5

.....

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4. There are 10 boys and 15 girls in a class. Two children are chosen at random. Using tree diagram or otherwise, find the probability that:

a) both are boys

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b) both are girls

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c) one is a boy and one is a girl

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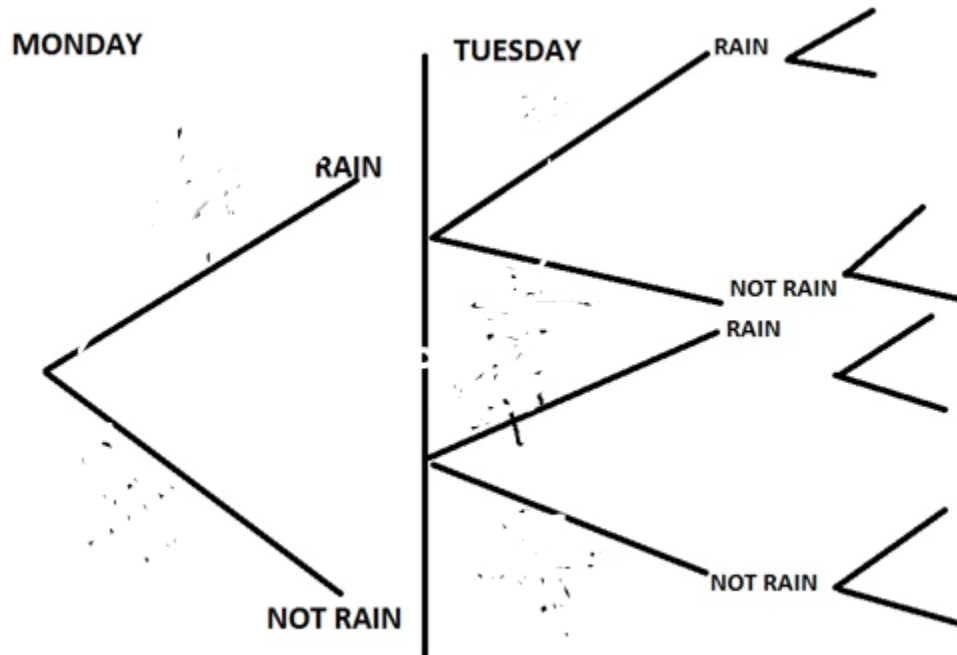
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5. In the winter England the probability that it rains on any one day is $\frac{5}{7}$
three-diagram shows the probability of it raining or it not raining on
days. the three diagram



- a. Find the probability that it will rain on both Monday and
Tuesday

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.....

.....

.....

b. It will rain on either Monday or Tuesday but not both.

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c. Calculate the probability that three heads will appear when
three tossed together once .head or tall are equality likely.

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6. A farmer has ten (10) flowering plants: 5 will flower red, 3 will flower
yellow and 2 will flower white

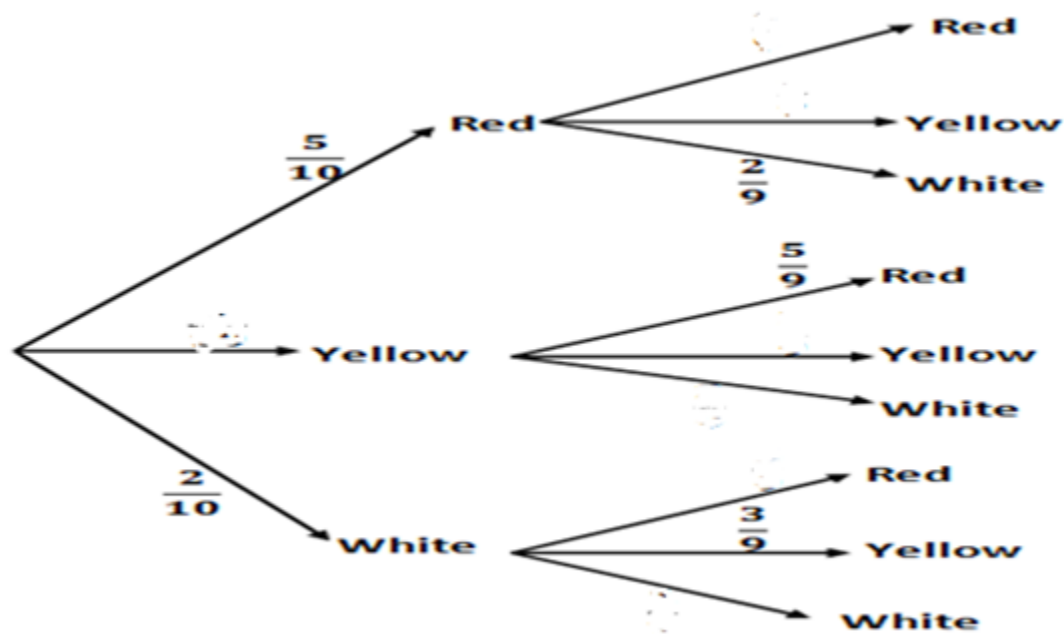
a) What is the probability that the first plant to flower is yellow

.....

.....

.....

b) Fill the correct probability on each branch-some are done for
you



c)

- i. What is the probability that first two plants to flower are both red?

.....

- ii. what is the probability that the first two plants are: One is red followed by a yellow or one yellow followed by a red

.....

7. Five coins are tossed. What is the probability of obtaining

a. Exactly 3 heads?

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.....
.....

At least 3 heads?

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.....

8. In a sample space of 50 people, 19 had type O blood, 22 had type A blood, 7 had type B blood, and 2 had type AB blood. If a person is selected at random, find the probability that the person

a) Has type A blood

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.....
.....

b) Has type B or type AB blood

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.....
.....

c) Does not have type O blood

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.....

d) Has neither type A nor type O blood.

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.....

9.

a) Two dice are rolled and the score is defined as the product of the numbers showing on the uppermost faces. Write out the

possibility space and use it to find the following probabilities.

		1st DIE					
	X	1	2	3	4	5	6
2nd DIE	1						
	2			6			
	3					15	
	4						
	5		10				
	6						

b) the probability of 12 or more

.....

.....

.....

c) the probability of odd numbers

.....

.....

.....

d) the probability of square numbers

.....

.....

10. There are 5 chocolates left in a box all looking the same. 3 are raspberry creams (R), 2 are nougats (N).

- a) Draw a tree diagram to show the probabilities if 2 chocolates are taken at random without replacement.

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Find the probabilities of

- i) Both being nougats

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- ii) The 1st being a raspberry cream and the 2nd being a nougat

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- iii) One of each type

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Answers

Chapter 1: sets

1.1 Multiple choices

1. B
2. C
3. A
4. D
5. B
6. C
7. C

7.2 Structured questions

1.

- i) $A \cup B = \{1,2,3,4,5,7\}$
- ii) $A \cap B = \{1,3\}$

2.

- a) $A = \{2,4,6,8,10,12\}$ and $C = \{4,8,12\}$
 $\therefore A \cap C = \{4,8,12\}$
- b) $A = \{2,4,6,8,10,12\}, B = \{3,6,9,12\}$ and $C = \{4,8,12\}$
 $\therefore A \cup (B \cap C) = \{2,4,6,8,10,12\}$
- c) $A' = \{3,5,7,9,11\}$ and $(B \cup C) = \{3,4,6,8,9,12\}$
 $A' \cap (B \cup C) = \{3,9\}$

3.

- a) 160
- b) 150
- c) 590
- d) 110
- e) 20
- f) 610

4. $\{ \}, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\},$

5. i) $A \cap B = \{1, 3, 5, 6\}$

ii) $A \cup B = \{1, 2, 3, 4, 5, 6\}$

Chapter 2: exponents and logarithms

2.1 multiple choice

1. B
2. B
3. D
4. B
5. C
6. D
7. A
8. C
9. B
10. D
11. C
12. C
13. D
14. A
15. C
16. B
17. A
18. A
19. A
20. D
21. A
22. C
23. C

2.2 structured questions

1. $(2^2)^{x+2} = 2^3$

$$2^{2x+4} = 2^3$$

$$2x + 4 = 3$$

$$2x = 3 - 4 \Rightarrow 2x = -1$$

$$x = -\frac{1}{2}$$

$$2. 16^{1/4} = 2$$

$$3. \text{Log } 12 = \log 4 + \log 3$$

$$= \text{Log } 4 + \log 3$$

$$= \log 2^2 + \text{Log } 3$$

$$= 2\log 2 + \log 3$$

$$= 2(0.3010) + (0.4771)$$

$$= 1.0791$$

$$4. \frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}} = \frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}} \cdot \frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} + \sqrt{2}}$$

$$= \frac{5 + \sqrt{10} + \sqrt{10} + 2}{3} = \frac{7 + 2\sqrt{10}}{3}$$

$$5. 3\sqrt{2x25} - 5\sqrt{2x16} + 4\sqrt{2x4} = 15\sqrt{2} - 20\sqrt{2} + 8\sqrt{2} = 3\sqrt{2}$$

$$6. 5\sqrt{36 \times 2} = 30\sqrt{2}$$

$$7. \text{Log } \frac{4}{3} = \log 4 - \log 3$$

$$= \log 2^2 - \log 3$$

$$= 2(0.3010) - (0.4771)$$

$$= 0.6020 - 0.4771$$

$$= 0.1249$$

$$8. \log 8 = \log_2 3 = 3 \log 2 = 3 \times 0.3010 = 0.9030$$

$$\begin{aligned} 9. \log 72 &= \log 9 \times \log 8 \\ &= \log 9 + \log 8 \\ &= \log 3^2 + \log 2^3 \\ &= 2\log 3 + 3\log 2 \\ &= 2(0.477) + 3(0.3010) \\ &= 1.87 \end{aligned}$$

$$\begin{aligned} 10. X+1 &= 8^{\frac{2}{3}} \\ X+1 &= 4 \\ X &= 3 \end{aligned}$$

Chapter 3: Series and sequences

3.1 Multiple choices

1. B
2. A
3. A
4. B
5. C
6. D
7. B

3.1 Structured questions

1. $a = 1$ and $d = 4$

$$\begin{aligned} a_{35} &= a + 34d \\ &= 1 + 34(4) \\ &= 137 \dots \dots \dots \text{The } 35^{\text{th}} \text{ term:} \end{aligned}$$

$$s = \frac{n}{2}(a + l)$$

$$s = \frac{35}{2}(1 + 137)$$

$$s = \frac{35}{2} \times 138$$

$$s = 2415 \dots \dots \dots \text{Sum of the 35 terms:}$$

2. First find the first term and the common difference

$$(a) \quad a + 2d = 20$$

$$a + 6d = 12$$

$$4d = -8$$

$$d = -2$$

$$\text{and } a + 2d = 20$$

$$a + 2(-2) = 20$$

$$a = 20 + 4 \Rightarrow a = 24$$

$$(b) \quad a_{20} = a + 19d$$

$$= 24 + 19(-2)$$

$$= 24 - 38$$

$$= -14$$

3.

a) The first term is 1

b) The common ratio is 4

c) The 5th term is 256

d) The 6th term is 1024

4.

$$\begin{aligned} \text{a) } a_{60} &= a + 59d \\ &= -1 + 59(5) \\ &= -1 + 295 \\ &= 294 \end{aligned}$$

$$\begin{aligned} \text{b) } S_n &= \frac{n}{2}(a+l) = \\ S_{60} &= \frac{60}{2}(-1+294) = 30 \times 293 = 8790 \end{aligned}$$

5.

- a) $d = 9$
- b) 10th term $= a + 9d = 7 + 9(9) = 88$
- c) The 56th term $= a + 55d = 7 + 55(9) = 502$
- d) **$7 + 9(n-1)$**

6. 5.6, 5.8, 6, 6.2, ...By using arithmetic sequence

$$a = 5.6 \text{ and } d = 5.8 - 5.6 = 0.2$$

$$d = 0.2$$

$$a_{30} = a + 29d$$

$$= 5.6 + 29(0.2)$$

$$= 5.6 + 5.8$$

$$= 11.4 \text{ km}$$

Chapter 4: Matrices

4.1 Multiple choices

1. A
2. C
3. A
4. D
5. A
6. C
7. A
8. B
9. C
10. A
11. B
12. C

4.2 Structured questions

1.

$$\text{i) } R = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix} + 2 \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$$

$$= \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix} + \begin{bmatrix} 4 & 2 \\ 6 & 4 \end{bmatrix}$$

$$= \begin{bmatrix} 7 & 3 \\ 10 & 6 \end{bmatrix}$$

$$ii) \quad R^{-1} = \frac{1}{12} \begin{pmatrix} 6 & -3 \\ -10 & 7 \end{pmatrix}$$

$$= \begin{pmatrix} \frac{6}{12} & \frac{-3}{12} \\ \frac{-10}{12} & \frac{7}{12} \end{pmatrix}$$

$$= \begin{pmatrix} \frac{1}{2} & \frac{-1}{4} \\ \frac{-5}{6} & \frac{7}{12} \end{pmatrix}$$

$$2. \quad M^{-1} = \frac{1}{6+25} \begin{pmatrix} 2 & 5 \\ -5 & 3 \end{pmatrix} = \begin{pmatrix} 2/31 & 5/31 \\ -5/31 & 3/31 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2/31 & 5/31 \\ -5/31 & 3/31 \end{pmatrix} \begin{pmatrix} -9 \\ 16 \end{pmatrix} \Rightarrow \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -18/31 + 80/31 \\ 45/31 + 48/31 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} =$$

$$\begin{pmatrix} 62/31 \\ 93/31 \end{pmatrix} \Rightarrow \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 3 \end{pmatrix} \therefore x = 2 \text{ and } y = 3$$

$$3. \quad C = AB = \begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix} \times \begin{bmatrix} 1 & -2 \\ -2 & 5 \end{bmatrix} = \begin{bmatrix} 2+2 & -4-5 \\ 4-6 & -8+15 \end{bmatrix}$$

$$\therefore C = \begin{bmatrix} 4 & -9 \\ -2 & 7 \end{bmatrix}$$

$$4. \quad (-2 \ 3) \begin{pmatrix} 4 \\ 5 \end{pmatrix} = -8 + 15 = 7$$

5. Let $M = \begin{pmatrix} x & y \\ w & z \end{pmatrix}$

$$2\begin{pmatrix} x & y \\ w & z \end{pmatrix} - \begin{pmatrix} 0 & 4 \\ -6 & 8 \end{pmatrix} = 3\begin{pmatrix} 2 & 0 \\ 0 & -4 \end{pmatrix}$$

$$\begin{pmatrix} 2x & 2y \\ 2w & 2z \end{pmatrix} - \begin{pmatrix} 0 & 4 \\ -6 & 8 \end{pmatrix} = \begin{pmatrix} 6 & 0 \\ 0 & -12 \end{pmatrix}$$

$$2x - 0 = 6, x = 3 \quad 2y - 4 = 0, y = 2 \quad 2w + 6 = 0, w = -3$$

$$2z - 8 = 12, z = -2$$

$$\therefore M = \begin{pmatrix} 3 & 2 \\ -3 & -2 \end{pmatrix}$$

6.

$$a) \quad AB = \begin{pmatrix} 27 - 44 + 8 & -3 - 4 - 6 \\ 9 - 66 + 32 & -1 - 6 - 24 \\ -45 + 11 + 8 & 5 + 1 - 6 \end{pmatrix} = \begin{pmatrix} -9 & -13 \\ -25 & -31 \\ -26 & 0 \end{pmatrix}$$

$$b) \quad C^{-1} = \frac{1}{32+21} \begin{pmatrix} 4 & 7 \\ -3 & 8 \end{pmatrix}$$

$$C^{-1} = \begin{pmatrix} 4/53 & 7/53 \\ -3/53 & 8/53 \end{pmatrix}$$

$$c) \quad P - 3 = 1 \Rightarrow p = 4 \quad 6 + m = 8 \Rightarrow m = 2 \quad 8 + 6 = t \Rightarrow t = 14$$

Chapter 5: number

5.1 Multiple choices

1. B
2. D
3. C
4. B
5. D
6. C
7. B
8. D
9. B
10. D
11. D
12. B
13. B
14. B
15. D
16. A
17. D
18. A
19. D

5.2 Structured questions

1. $\frac{26}{5} - \frac{5}{3} = \frac{78-25}{15} = \frac{53}{15} = 3\frac{8}{15}$

2. $\frac{9a-15}{9a^2-25} = \frac{3(3a-5)}{(3a-5)(3a+5)} = \frac{3}{3a+5}$

3. Lower bound = 1.5 and Upper bound = 2.5

4.

i. 0.25

ii. 0.2

5.

i. 4.5717×10^8

ii. 6.56×10^{-9}

Chapter 6: Distance, speed and time

6.1 Multiple choices

1. D

2. C

3. D

4. D

5. B

6. D

7. C

8. B

9. B

10. B

11. B

12. C

13. C

14. C

15. A

6.2 Structured questions

1.

a)

$$\text{i. } v = \frac{s}{t} = \frac{15\text{km}}{1\text{hr}} = 15\text{km/hr}$$

$$\text{ii. } v = \frac{s}{t} = \frac{15\text{km}}{2\text{hr}} = 7.5\text{km/hr}$$

iii.

$$\text{b) } V_{av} = \frac{\text{total distance}}{\text{time}} = \frac{30}{3} = 10 \text{ km/hr}$$

2. The time taken for the first 90km is $1\frac{1}{2}\text{hr}$ For the next $3\frac{1}{2}$

hours he travelled a distance of 280km. Therefore the average speed for the whole journey is

$$\frac{\text{total distance}}{\text{total time}} = \frac{90\text{km} + 280\text{km}}{1\frac{1}{2}\text{hr} + 3\frac{1}{2}\text{hr}} = \frac{370\text{km}}{5\text{hr}} = 74\text{km/hr}$$

3.

a) Total distance = total area

$$= (10 \times 30) + \left(\frac{10 \times 30}{2}\right)$$

$$= 300 + 150$$

$$= 450\text{m}$$

b) the distance travelled at constant speed = area of the
rectangle = $10 \times 30 = 300\text{m}$

$$\text{c) } v_{\text{av}} = \frac{30+0}{2} = 15$$

$$s = (v_{\text{av}})(t)$$

$$s = (15\text{m/s})(10\text{s})$$

$$s = 150\text{m}$$

$$\text{d) } a = \frac{v-u}{t} \Rightarrow a = \frac{0-30}{10}$$

$$a = -3\text{m/s}^2$$

4. Using average formula

$$\frac{40 + 40 + 40 + x}{4} = 45$$

$$120 + x = 180$$

$x = 60$...The average speed for the last hour is 60km/hr.

Chapter 7: Ratio, proportion and percentage

7.1 Multiple choices

1. A
2. A
3. C
4. D
5. C
6. C
7. B
8. A

- 9. C
- 10. D
- 11. C
- 12. D
- 13. A
- 14. B
- 15. A
- 16. B
- 17. D
- 18. D
- 19. B
- 20. C
- 21. B
- 22. C
- 23. B
- 24. C
- 25. C
- 26. D
- 27. B
- 28. A
- 29. D
- 30. C
- 31. D
- 32. D
- 33. A
- 34. B

- 35. C
- 36. C
- 37. C
- 38. C
- 39. B

7.2 Structured questions

1. $5\text{km} = 500,000\text{cm}$ 10cm on the map represents $500,000\text{cm}$ on the ground, therefore 1cm on the map will represent $50,000\text{cm}$ on the ground.

2. $\frac{7.5}{100} \times 25200 = 1890$ (2 marks)

3. The commission on the goats = 4% of $\text{£ } 35\,000 = \text{£ } 1400$
The commission on the cattle = $\text{£ } 6\,300 - \text{£ } 1400 = \text{£ } 4900$

$$\frac{7}{100} (\text{the value of the } \textit{salles of the cattle}) = \text{£ } 4900$$

$$\therefore \text{the value of the } \textit{salles of the cattle} = \text{£ } 70,000$$

4. Their ratios = $2:3:5$ and the total ratios = 10 Safia gets

$$\frac{2}{10} 80 = 16 \text{ books} \quad \text{Ayan gets } \frac{3}{10} 80 = 24 \text{ books}$$

$$\text{Omar gets } \frac{5}{10} 80 = 40 \text{ books}$$

5. The total cost price for 20 toys is $\$240 + \$60 = \$300$

The cost price of each toy is $\frac{300}{20} = \$15$

$$\therefore \frac{140}{100} \times 15 = \text{selling price}$$

Selling price = \$21

In Somaliland shilling the selling price is

$$21 \times 6300 = 132300 \text{ SL.SH. for each toy}$$

6.

a) Let x be the distance b/w the two places

$$\frac{1}{50,000} = \frac{20}{x} \Rightarrow x = 1000,000 \text{ cm which is } 10 \text{ km}$$

b) 1cm: 50000cm

$$(1\text{cm})^2 : (50000\text{cm})^2$$

$$1\text{cm}^2 : 2500000000\text{cm}^2$$

$$1\text{cm}^2 : 250000\text{m}^2$$

$$\frac{1}{2} \text{cm}^2 = 125000\text{m}^2$$

$\therefore$ The area on the map is $\frac{1}{2} \text{cm}^2$

7.

a) The hire purchase price = $\frac{125}{100} \times 27000 = \$33750$

b) $\frac{33750 - 8000}{25} = 1030 \dots \dots \dots$ The monthly installment is \$1030

8. The ratio of their ages is 5:3:2

$$\text{Mohamed received } \frac{5}{10} \times 1000 = 500$$

$$\text{Ali received } \frac{3}{10} \times 1000 = 300$$

$$\text{Asha received } \frac{2}{10} \times 1000 = 200$$

9.

a) In the first hour he sold 25% of 8000=2000 In the 2nd hour, he sold 30% of 6000= 1800. He sold in total 2000+1800= 3800chickens

b) $\frac{3800}{8000} \times 100\% = 47.5\%$ The percentage of the original did he sell in the two hours is 47.5%

10.

$$\text{a) percentage increase} = \frac{7087000 - 4714900}{4714900} \times 100\% = 50.3\%$$

b)

i. $4710000(3\text{sf})$

ii. 7.087000×10^6

11.

$$\text{a) } \frac{78}{100} \times \$35 = \$27.3 \therefore$$

The sale price of the jumper is \$27.3

$$\text{b) The deposit of 25\% of the cash price} = 25\% \text{ of } 260 = 65$$

The total hire purchase price of the television

$$65 + 15(14) = 275$$

$$12.a) A = P(1 + in)$$

$$= 40000 \left(1 + \frac{3 \times 5}{100} \right)$$

$$= 40000 \left(\frac{115}{100} \right)$$

$$= sh\ 46000$$

$$b) I = Pin = \frac{40000 \times 3 \times 5}{100} = sh\ 6000$$

c) let A be 2p

$$A = P(1 + in)$$

$$2p = P(1 + in)$$

$$2 = \left(1 + \frac{3n}{100} \right)$$

$$2 = \frac{100 + 3n}{100}$$

$$3n + 100 = 200$$

$$3n = 100$$

$$\therefore n = 33\frac{1}{3} \text{ years}$$

13)

$$i) \quad \frac{5}{8} \times 976 = 610 \therefore 610 \text{ kgs of sand are needed.}$$

$$ii) \quad \frac{3}{8} \times 976 = 366 \therefore 366 \text{ kgs of gravel are needed}$$

14. Let x be the buying price $\frac{130}{100}(x) = 250 \Rightarrow x = 192.31$

∴ The buying price is \$192.31

15. $\frac{80}{100}(12) = 9.6$ The selling price was \$9.6

16. After reduced the price by 20% the price becomes

$$80\% \text{ of } 30 = 24$$

After increasing 24 by 20% the final price of the shirt

Becomes 120% of 24 = 28.

17. $\frac{20 \times 30}{20 + 30} = 12 \text{ minutes}$

18. a)
$$\begin{aligned} 5x + 8y &= 281 \\ x + y &= 40 \end{aligned}$$

b) let x be 5-foot timbers, and y 8-foot timbers

$$\begin{aligned} 5x + 8y &= 281 \\ -5x - 5y &= -200 \end{aligned}$$

Solving simultaneously, we obtain, $y = 27$ and $x = 13$

c)
$$\begin{aligned} 22 \times 8 + 8 \times 5 \\ &= 176 + 40 \\ &= 216 \end{aligned}$$

Chapter 8: Statistics

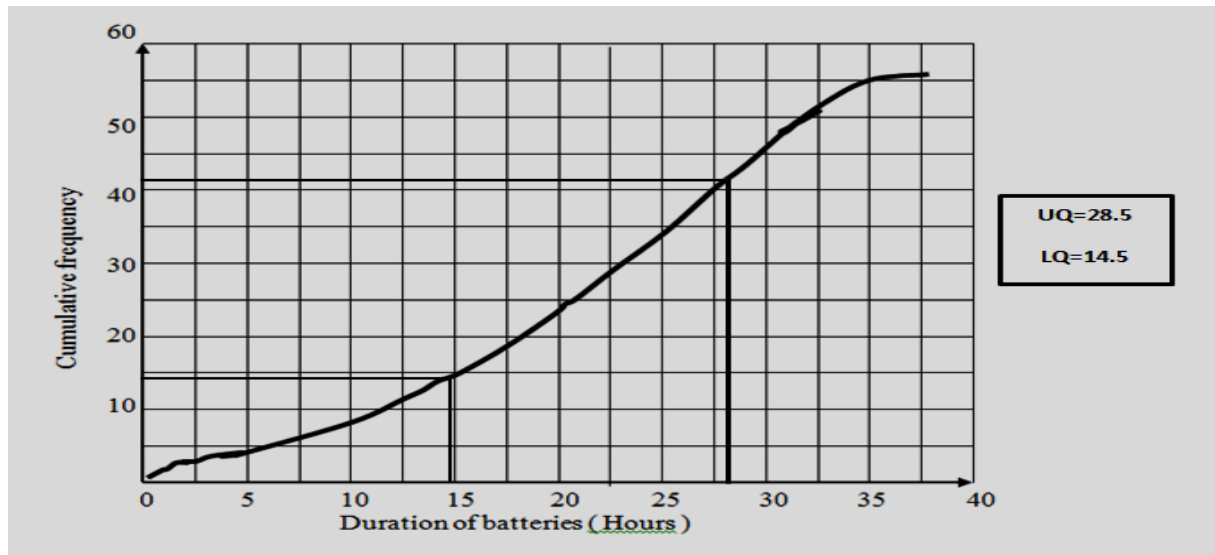
8.1 Multiple choices

1. B
2. B
3. D
4. D
5. C
6. C
7. C
8. D
9. D
10. A
11. D
12. C
13. D
14. C
15. B
16. D
17. D
18. B
19. B
20. A
21. C

8.2 Structured questions

1.

i.



ii. Median = 22.5

$$\begin{aligned} \text{IQR} &= \text{UQ} - \text{LQ} \\ &= 28.5 - 14.5 \\ &= 14 \end{aligned}$$

2.

i. Modal class=40-44

ii.

Time in Seconds	Number of Athletes(f)	Class midpoint (x)	Fx
30 – 34	1	32	32
35 - 39	6	37	222

40 - 44	10	42	420
45 - 49	8	47	376
50 - 54	3	52	156
55 - 59	2	57	114
	30		1320

$$\text{mean} = \frac{\sum xf}{\sum f} = \frac{1320}{30} = 44$$

3.

a) $x = 19$ and $y = 30$

b) mode = 5

$$\text{c) mean} = \frac{\sum(3+8+6+8+95)}{30} = 4$$

4.

a)

Class	Class Mid-point	No. of students	
Mass(kg)	X	Frequency(F)	F x
33-37	35	4	140
38-42	40	10	400
43-47	45	16	720
48-52	50	8	400
53-57	55	2	110
		40	1770

b) $\sum Fx = 1770$

c) mean mass = $\frac{\sum fx}{\sum f} = \frac{1770}{40} = 44.25$

5.

a) Mean mark = $\frac{2 \times 3 + 4 \times 3 + 5 \times 6 + 6 \times 4 + 7 \times 3 + 8 \times 2}{2 + 3 + 6 + 4 + 3 + 2} = \frac{109}{20} = 5.45$

b) Modal mark = 5

c) Median mark = 5

6.

a) Median mark = 56

b) Inter-quartile range = upper quartile – lower quartile
= 69-39
= 30

c) If 80% of the pupils are to be successful it means 64 pupils are to be successful and 16 pupils failed. The pass mark is 34

7.

a) Let x be the fraction of his wage spent on food

$$\frac{x}{120} = \frac{810}{90} \Rightarrow x = 1080$$

The fraction of his wage spent on food is \$1080

b) $\frac{90}{360} \times 100\% = 25\%$

The percentage of his wages spent on bus is 25%

c) Let x be his monthly wage

$$\frac{810}{90} = \frac{x}{360} \Rightarrow x = 3240$$

His monthly wage is \$3240

8.

a) The modal class is 40-44

b)

Wages in \$	Frequency(f)	Class midpoint (x)	Fx
30-34	1	32	32
35-39	6	37	222
40-44	10	42	420
45-49	8	47	376
50-54	2	52	104
55-59	3	57	171
	30		1325

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{1325}{30} = 44.2$$

9.

a) Let x = the total area of the land

$$\frac{80}{4} = \frac{360}{x}$$

$$80x = 1440$$

$$x = 18 \text{ hectors}$$

b) Let x = the area in hectors for beans

$$\frac{80}{4} = \frac{110}{x}$$

$$80x = 440$$

$$x = 5.5 \text{ hectares}$$

10.

$$a) \text{ mean} = \frac{(3 \times 7) + (4 \times 6) + (4 \times 4) + (3 \times 3) + 0 + (2 \times 1) + (3 \times 2) + (5 \times 5) + (3 \times 8) + 9 + 10}{30}$$

$$= \frac{21 + 24 + 16 + 9 + 0 + 2 + 6 + 25 + 24 + 9 + 10}{30} = \frac{146}{30} = 4.86667$$

b) First order the numbers in their ascending way

0,1,1,2,2,3,3,3,4,4,4,4,5,5,5,5,5,6,6,6,6,7,7,7,8,8,8,9,10

$$\text{Median} = \frac{5+5}{2} = 5$$

c) Mode = 5

11. The range of data (a) is $24 - 20 = 4$ and the range of data (b) is $36 - 8 = 28$. The variability of data (b) is much greater than the variability of data (a).

12.

$$a. \text{ mean}(\bar{x}) = \frac{2+3+5+7+8}{5} = \frac{25}{5} = 5$$

b.

x	$x - \bar{x}$	$(x - \bar{x})^2$
2	3	9
3	2	4

5	0	0
7	2	4
8	3	9

$$\sum (x - \bar{x})^2 = 26$$

$$\therefore sd = \sqrt{\frac{\sum (x - \bar{x})^2}{n}} = \sqrt{\frac{26}{5}} = 2.28$$

13.

- a) 7 students
- b) 42 students
- c)
 - i) 9
 - ii) 8
 - iii) 8.3

d) $\frac{5}{50} \times 360 = 36^\circ$

14.

- a. 45 houses
- b. $2+20+45+40+25=135$
- c. mean = $\frac{135}{45} = 3$

15.

- a) flat 4
- b) 15 flats

c) Let x = type of flats and f = no. of houses

$$\text{mean} = \frac{\sum fx}{\sum f} = \frac{100 + 400 + 1200 + 2400 + 1500}{2100} = 2.7$$

16.

a)

Mass in kg	Class mark	No.of boys (f)	Fx
40-44	42	3	126
45-49	47	9	423
50-54	52	21	1092
55-59	57	13	741
60-64	62	4	248
	Total	50	2630

b) 50-54

c) $\text{mean} = \frac{\sum fx}{\sum f} = \frac{2630}{50} = 52.6$

17.

i) $-4^{\circ}\text{C}, -2^{\circ}\text{C}, -1^{\circ}\text{C}, 0^{\circ}\text{C}, 1^{\circ}\text{C}, 3^{\circ}\text{C}, 7^{\circ}\text{C}.$

ii) $7 - (-4) = 11$

18.

i) Let x be Abdi's monthly income

$$\frac{x}{360} = \frac{150}{90} \Rightarrow x = 600 \quad \text{Abdi's monthly income is \$600}$$

ii) Let x be Abdi's monthly payment for rent

$$\frac{x}{120} = \frac{150}{90} \Rightarrow x = 200 \quad \text{Abdi's monthly payment for rent is \$200}$$

19.

a)

Height (in cm)	Class mark (x)	Frequency (f)	Fx
150-154	152	3	456
155-159	157	11	1727
160-164	162	14	2268
165-169	167	10	1670
170-174	172	8	1376
175-179	177	4	708
	Total	50	8205

b) Modal class is 160-164

c) $\text{mean} = \frac{\sum fx}{\sum f} \Rightarrow \text{Mean} = \frac{8205}{50} \text{Mean} = 164.1$

The mean height is 164.1

20.

i) Range = ~~39~~ - 6 = 33

ii) Mean =
$$\frac{13+36+15+13+21+18+37+18+12+21+18+20+6+37+39}{15}$$

$$= \frac{324}{15} = 21.6$$

iii) The mode is 18

iv) Median = 6, 12, 13, 13, 15, 18, 18, 18, 20, 21, 21, 36, 37, 37, 39
 Median = 18

21. a) 42 students

b)
$$m_d = L + \left(\frac{\frac{n}{2} - m}{f_m} \right) x w$$

$$= 80 + \left(\frac{\frac{140}{2} - 48}{42} \right) x 10$$

$$= 85.23$$

c) 140 represents 300

22 represents x

$$x = \frac{22 \times 300}{140} = 47.14 \text{ kg}$$

Chapter 9: Probability

9.1 Multiple choices

1. C
2. D
3. A
4. D
5. D
6. A
7. C
8. C
9. C
10. A
11. B
12. A
13. D
14. D
15. A
16. A
17. B
18. C

9.2 Structured questions

- 1.

$$a) P(\text{total of 5 or a total of 7}) = \frac{4}{36} + \frac{6}{36} = \frac{10}{36} = \frac{5}{18}$$

$$b) p(\text{same number on both dice or a total of 6}) = \frac{6}{36} + \frac{5}{36} - \frac{1}{36} = \frac{5}{18}$$

$$c) P(\text{at least a total of 8}) = \frac{15}{36} = \frac{5}{12}$$

2.

$$a) {}^5_3C \times {}^4_2C = \frac{5!}{3!(5-3)!} \times \frac{4!}{2!(4-2)!} = 10 \times 6 = 60 \text{ ways of selection}$$

$$b) p = \frac{7!}{3! \times 2!} = 420 \text{ possible ways can be permuted}$$

3. a)

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

b)

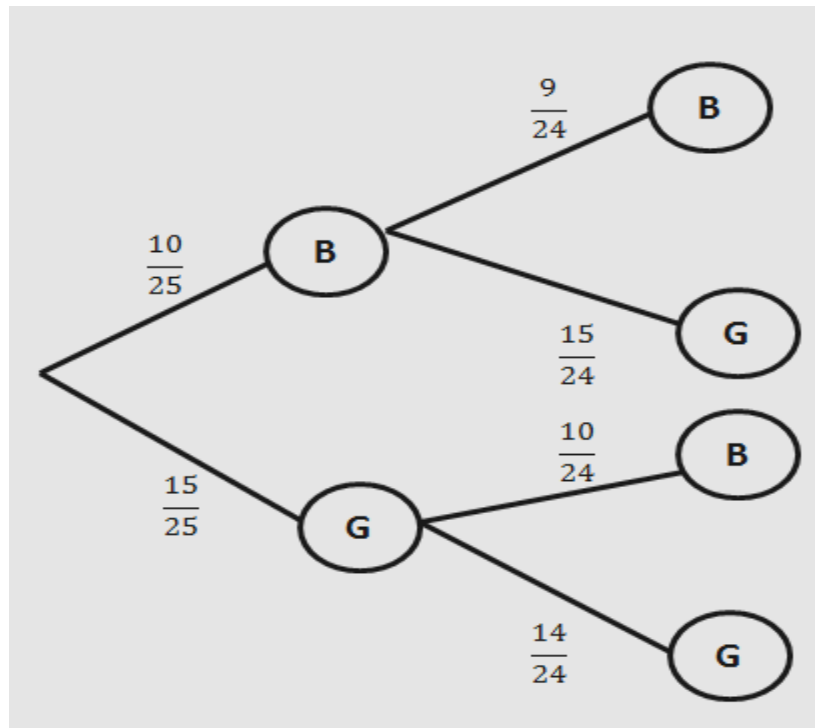
$$i) \quad \text{The probability of a total score of 11 is } \frac{2}{36} = \frac{1}{18}$$

$$ii) \quad \text{the probability of an even sum is } \frac{18}{36} = \frac{1}{2}$$

iii) $P(\text{a number greater than 8})$ is $\frac{10}{36} = \frac{5}{18}$

iv) $P(\text{a total which is a multiple of 2 or 5})$ is $\frac{6}{36} + \frac{2}{36} = \frac{8}{36} = \frac{2}{9}$

4.

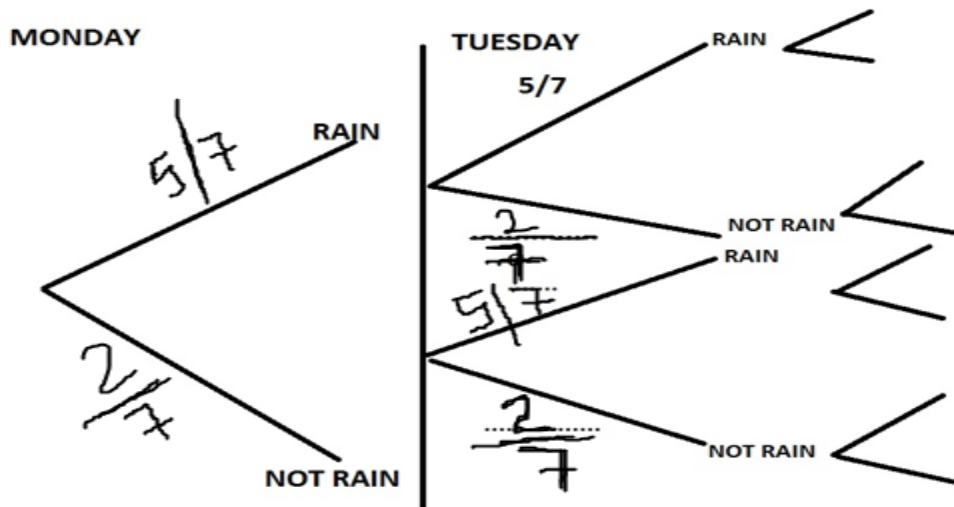


a) $P(BB) = \frac{10}{25} \times \frac{9}{24} = \frac{90}{600} = \frac{3}{20}$

b) $P(GG) = \frac{15}{25} \times \frac{14}{24} = \frac{210}{600} = \frac{7}{20}$

c) $P(BG \text{ or } GB) = \frac{10}{25} \times \frac{15}{24} + \frac{15}{25} \times \frac{10}{24} = \frac{150}{600} + \frac{150}{600} = \frac{1}{2}$

5.



NOTE: THE PROBABILITY THAT IT WILL RAIN ON BOTH MONDAY AND TUESDAY

a) $\frac{5}{7} \times \frac{5}{7} = \frac{25}{49}$

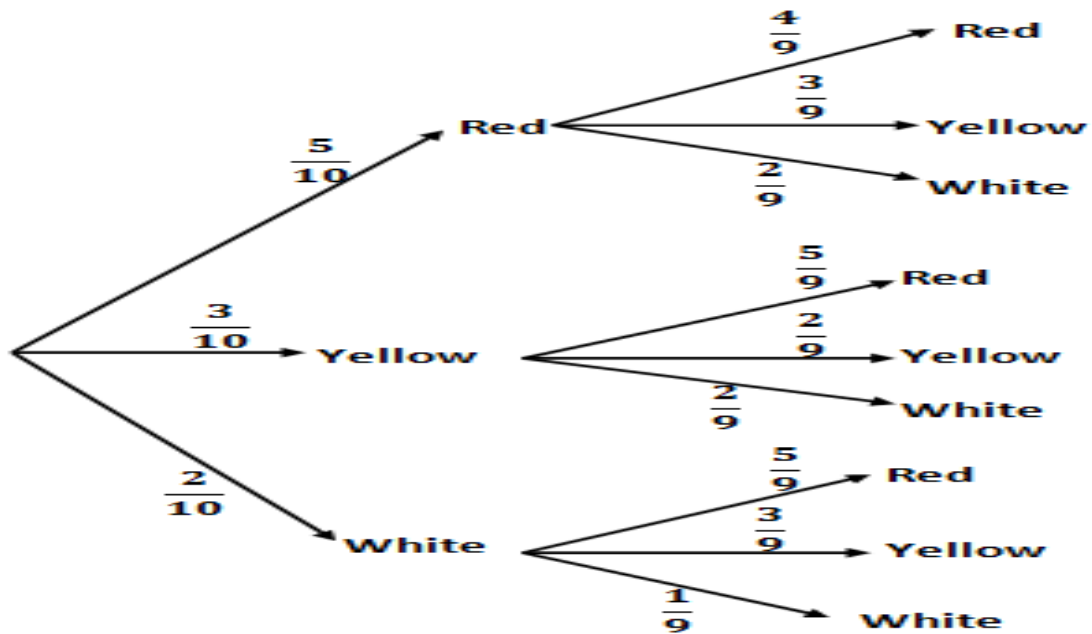
b) $\frac{5}{7} \times \frac{2}{7} + \frac{2}{7} \times \frac{5}{7} = \frac{14}{49} + \frac{14}{49} = \frac{28}{49}$

c) (3 heads) = $\frac{1}{8}$

6.

a) $p(\text{yellow flower}) = \frac{3}{10}$

b)



c)

i. $p(RR) \frac{5}{10} \times \frac{4}{9} = \frac{20}{90} = \frac{2}{9}$

ii. $p(RY) + p(Yr) = \frac{5}{10} \times \frac{3}{9} + \frac{3}{10} \times \frac{5}{9} = \frac{15}{90} + \frac{15}{90} = \frac{1}{3}$

7.

a) $P(\text{Exactly 3 heads}) = \frac{10}{32}$

b) $P(\text{At least 3 heads}) = \frac{16}{32} = \frac{1}{2}$

8.

a) $\frac{22}{50}$

b) $\frac{7}{50} + \frac{2}{50} = \frac{9}{50}$

c) $1 - \frac{19}{50} = \frac{31}{50}$

d) $1 - \frac{22}{50} + \frac{19}{50} = \frac{9}{50}$

9.

a)

		1 st DIE					
2 nd DIE	X	1	2	3	4	5	6
	1	1	2	3	4	5	6
	2	2	4	6	8	10	12
	3	3	6	9	12	15	18
	4	4	8	12	16	20	24
	5	5	10	15	20	25	30
	6	6	12	18	24	30	36

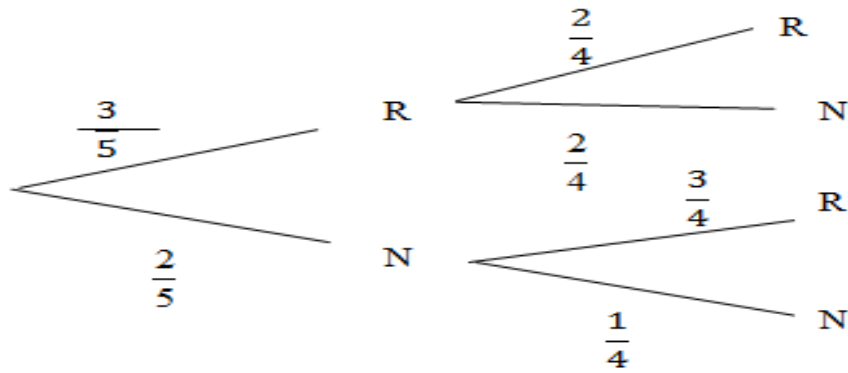
b) The probability of 12 or more is $\frac{17}{36}$

c) The probability of odd numbers is $\frac{9}{36} = \frac{1}{4}$

d) The probability of square numbers is $\frac{6}{36} = \frac{1}{6}$

10.

a)



b)

i. $P(NN) = \frac{2}{5} \times \frac{1}{4} = \frac{2}{20} = \frac{1}{10}$

ii. $P(RN) = \frac{3}{5} \times \frac{2}{4} = \frac{3}{10}$

iii. $\frac{3}{5} \times \frac{2}{4} + \frac{2}{5} \times \frac{3}{4} = \frac{3}{5}$

The end