basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

ANNUAL NATIONAL ASSESSMENT 2013
GRADE 9 MATHEMATICS
TEST

MARKS: 140

TIME: $2\frac{1}{2}$ hours

PROVINCE _____

REGION _____

DISTRICT _____

SCHOOL NAME _____

EMIS NUMBER (9 digits)

CLASS (e.g. 9A) _____

SURNAME _____

NAME _____

GENDER (✓) | BOY | | | GIRL | |

DATE OF BIRTH | C | C | Y | Y | M | M | D | D |

This test consists of 24 pages, excluding the cover page.

Instructions to the learner

1. Read all the instructions carefully.

2. Question 1 consists of 10 multiple-choice questions. Circle the letter of the correct answer.

3. Answer questions 2 to14 in the spaces or frames provided.

4. Show all working.

5. Give a reason for each statement in **QUESTION 8.**

6. The test counts 140 marks.

7. The test duration is $2\frac{1}{2}$ hours.

8. The teacher will lead you through the practice exercise before you start the test.

9. You may use an approved scientific calculator (non-programmable and non-graphical).

Practice exercise

Circle the letter of the correct answer.

Which of the numbers below is a mixed number?

$0; \quad 0,2; \quad \frac{1}{8}; \quad 2\frac{1}{4}$

A   0

B $2\frac{1}{4}$

C   0,2

D $\frac{1}{8}$

You have answered the question correctly if you have circled B.

The test starts on the next page.

QUESTION 1

1.1   Which ONE of the following numbers is an irrational number?

     A $\dfrac{-3}{5}$

     B $\sqrt{5}$

     C $0,\dot{3}$

     D $\sqrt[3]{-64}$

1.2   Which number is missing in the number sequence?

$$\frac{1}{3} \; ; \; \ldots \; ; \; \frac{1}{12} \; ; \; \frac{1}{24} \; ; \; \frac{1}{48}$$

     A $\dfrac{1}{6}$

     B $\dfrac{1}{8}$

     C $\dfrac{1}{9}$

     D $\dfrac{1}{10}$

1.3   The straight line graph defined by $3y + 2x + 1 = 0$ will cut the X-axis at the point …

     A $(-2 \,;\, 0)$

     B $(-\dfrac{1}{2} \,;\, 0)$

     C $(-3 \,;\, 0)$

     D $(-\dfrac{1}{3} \,;\, 0)$

1.4   Given the expression: $\frac{x-y}{3} + 4 - x^2$

Circle the letter of the incorrect statement.

A   The expression consists of 3 terms.

B   The coefficient of x is 1.

C   The coefficient of x^2 is -1.

D   The expression contains 2 variables.

1.5   Complete: $(-3xy^2)^2 =$

A $-6x^2y^2$

B $-9x^2y^4$

C $9x^2y^4$

D $6x^2y^2$

1.6   0,000065 written in scientific notation is:

A $0,65 \times 10^{-5}$

B $7,0 \times 10^{-5}$

C $6,5 \times 10^{-5}$

D 65×10^{-5}

1.7   Complete: $9^{-1} \div 3^{-1} =$

A 3^2

B   9

C   3

D $\frac{1}{3}$

1.8   In the figure below, $PS \parallel QR$. Which ONE of the following statements is true for this figure?

A   ΔPTS ≡ ΔPQT

B   ΔPTS ≡ ΔRTQ

C   ΔPTS III ΔSRT
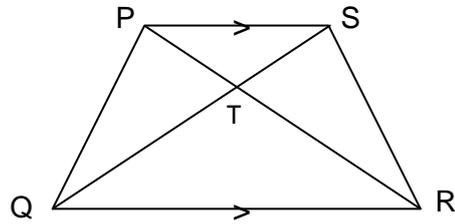
D   ΔPTS III ΔRTQ

1.9   In the figure below, side DF of ΔEDF is produced to C. Calculate the size of $\hat{E}$ in terms of x.
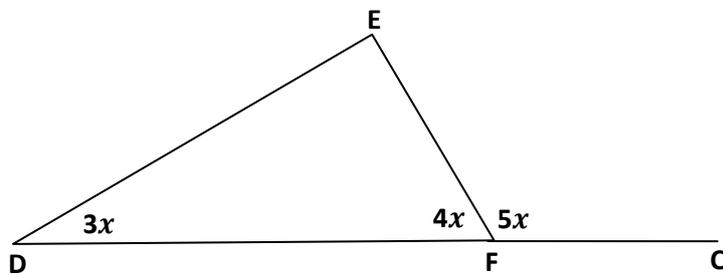
A $2x$

B $12x$

C $7x$

D $9x$

1.10
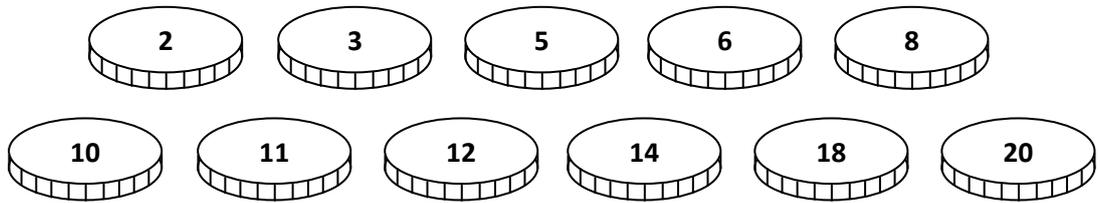
The above discs are placed into a bag. What is the probability of taking out a disc marked with a number that is a multiple of 4?

A $\dfrac{1}{11}$

B $\dfrac{8}{11}$

C $\dfrac{4}{11}$

D $\dfrac{3}{11}$

[10]

QUESTION 2

Simplify each of the following expressions:

2.1 $\dfrac{6x^5}{x^4} - \dfrac{15x^3}{3x^2}$

_____

_____ (3)

2.2 $x(x+2) - (x-1)(x-3)$

_____

_____

_____

_____ (4)

2.3 $\sqrt{225x^4} - \sqrt[3]{125x^6}$

_____

_____

_____

_____ (5)

2.4 $\dfrac{2x+1}{4} - \dfrac{x+2}{2} - \dfrac{1}{4}$

_____

_____

_____

_____ (4)

[16]

QUESTION 3

Factorise fully:

3.1 $6a^3 - 12a^2 + 18a$

_____

_____ (2)

3.2 $7x^2 - 28$

_____

_____ (2)

[4]

QUESTION 4

Solve for x:

4.1 $3x - 1 = 5$

_____

_____ (2)

4.2 $2(x - 2)^2 = (2x - 1)(x - 3)$

_____

_____

_____

_____ (4)

4.3 $\dfrac{2x - 3}{2} + \dfrac{x + 1}{3} = \dfrac{3x - 1}{2}$

_____

_____

_____

_____ (4)

4.4 $x^3 = 64$

_____

_____

_____ (2)

[12]

QUESTION 5

5.1 Write down the next TWO terms in the number sequence 7; 11; 15; ….

_____ (2)

5.2 Write down the general term Tn of the above number sequence.

$Tn =$ _____ (2)

5.3 Calculate the value of the 50th term.

_____

_____

_____ (2)

[6]

QUESTION 6

6.1 How long will it take to travel 432 kilometres at an average speed of 96 kilometres per hour?

_____

_____ (2)

6.2 Calculate the simple interest on R3 500 invested at 6% per annum for 3 years.

_____

_____

_____

_____

_____ (5)

6.3 Calculate how much money you will owe the bank after 3 years if you borrow R7 500 from the bank at 13% per annum compound interest.

_____

_____

_____

_____ (4)

[11]

QUESTION 7

7.1 Use the graph below to answer the questions that follow.
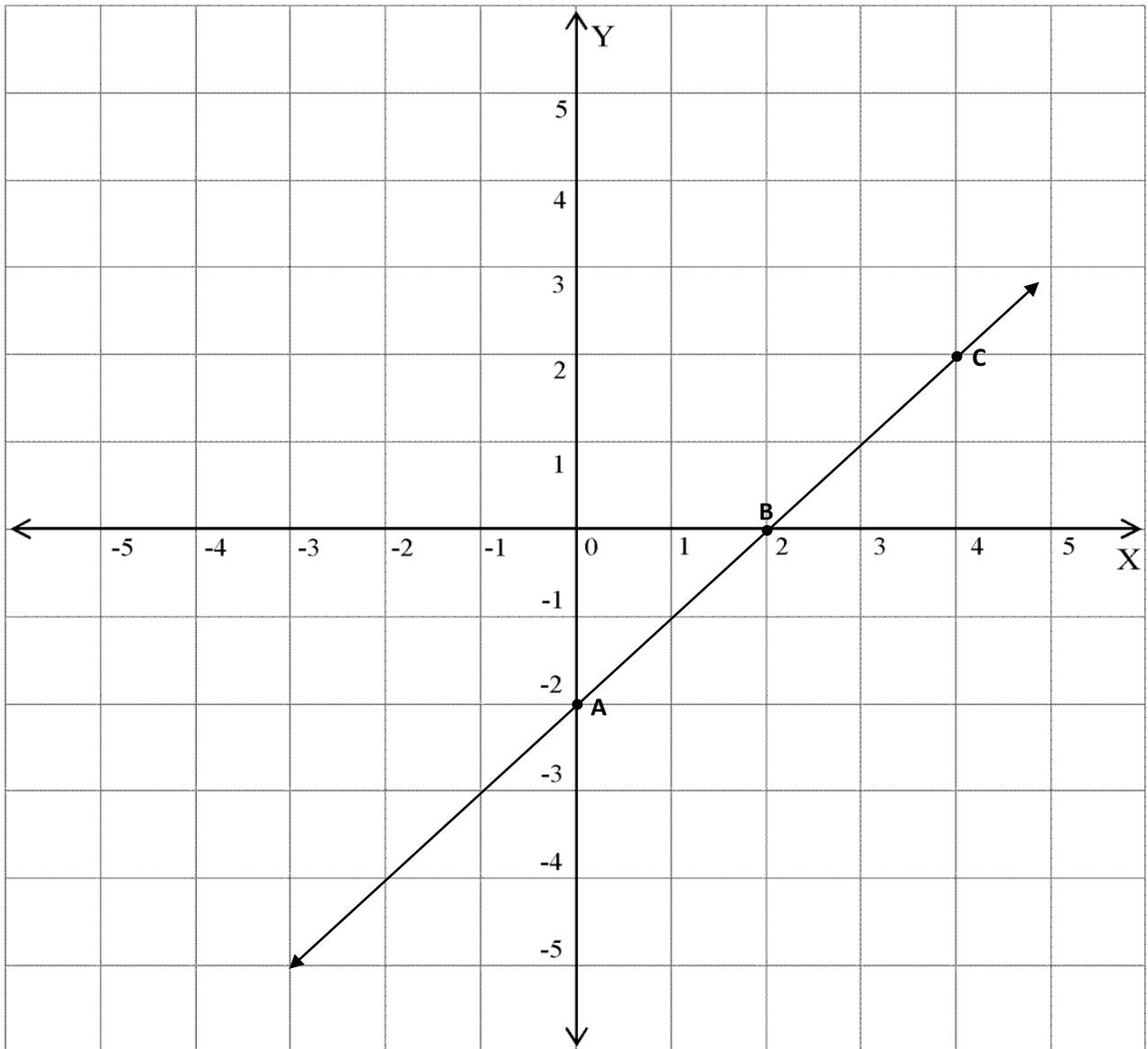
7.1.1 Write down the coordinates of points A, B and C in the table.

	A	B	C
x-coordinate			
y-coordinate			

(3)

7.1.2   Use the table in question 7.1.1 or any other method to determine the equation of line ABC.

_____

_____ (2)

7.2   Use the grid below to answer the questions that follow.

7.2.1   Draw the graphs defined by $y = -2x + 4$ and $x = 1$ on the given set of axes. Label each graph and clearly mark the points where the lines cut the axes.
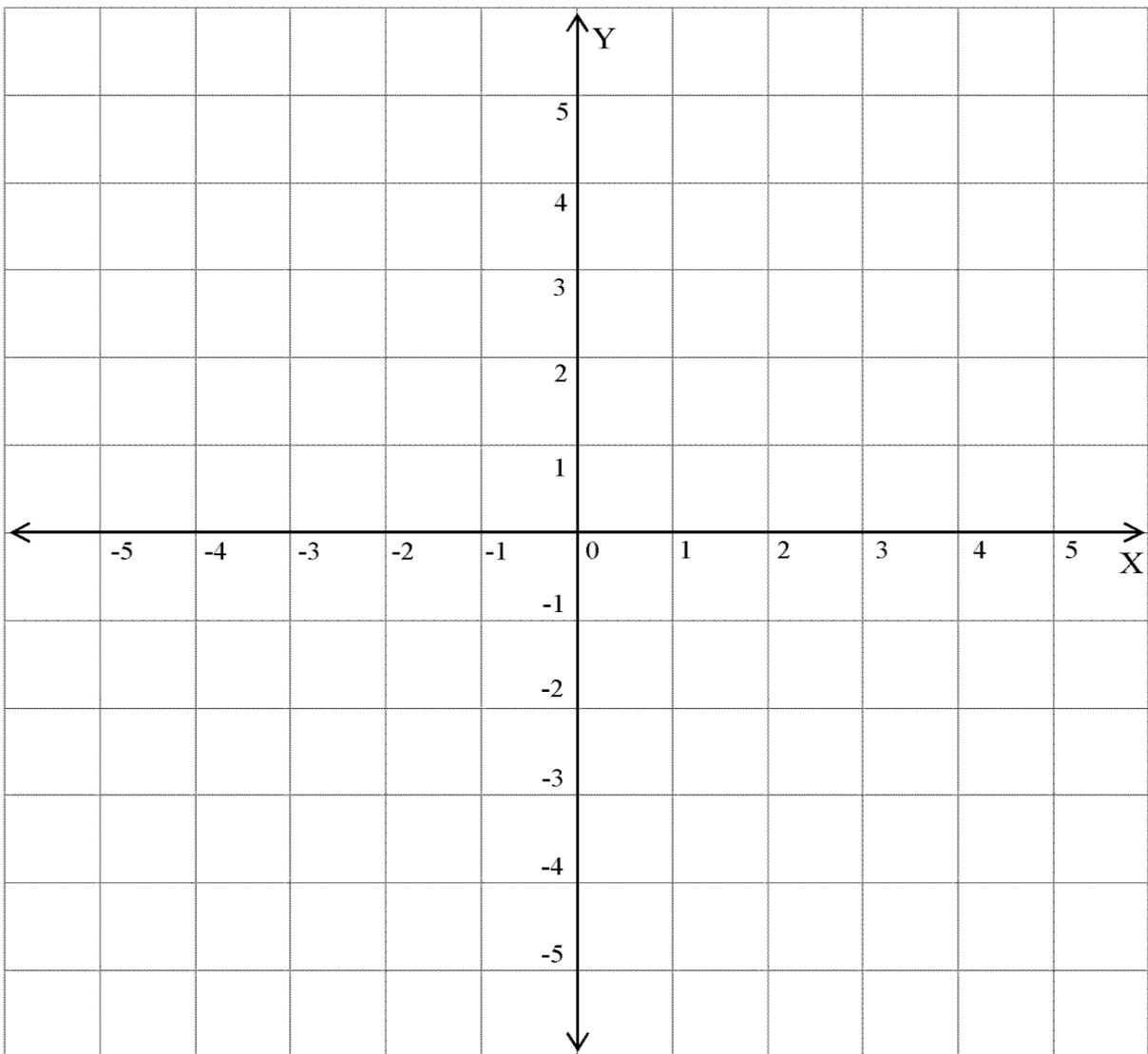
(5)

7.2.2 Write down the coordinates of the point where the two lines cut one another.

_____ (2)

[12]

QUESTION 8

8.1 In ΔPRT below, M is the midpoint of PR and $MR = MT$.
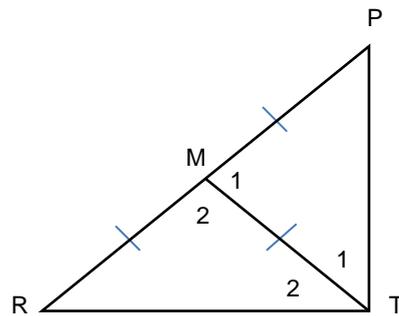
If $\hat{P} = 25°$, calculate with reasons:

8.1.1 The size of $\hat{T}_1$

_____

_____ (1)

8.1.2 The size of $\hat{M}_2$

_____

_____ (1)

8.1.3 The size of $\hat{R}$

_____

_____ (3)

8.2   In $\triangle ABC$, D and E are points on BC such that $BD = EC$ and $AD = AE$.
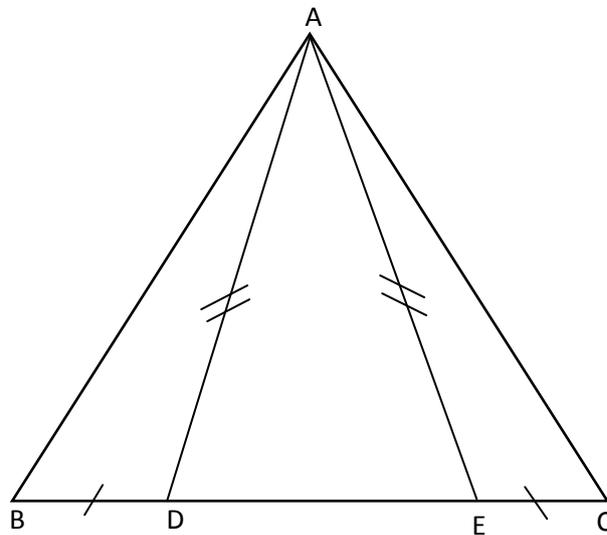

8.2.1   Why is $BE = CD$?

_____   (1)

8.2.2   Which triangle is congruent to $\triangle ABE$?

_____   (1)

8.3 In the figure below $\triangle KNQ$ and $\triangle MPQ$ have a common vertex Q.

P is a point on KQ and N is a point on MQ.

$KQ = MQ$ and $PQ = QN$.
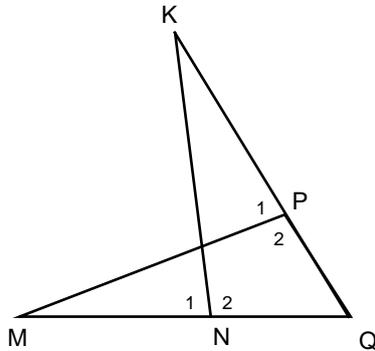
Prove with reasons that $\triangle KNQ \equiv \triangle MPQ$.

_____

_____

_____

_____ (4)

8.4 In $\triangle NML$ below, P and Q are points on the sides MN and LN respectively such that $QP \parallel LM$.

$MN = 16$ cm, $QP = 3$ cm and $LM = 8$ cm.
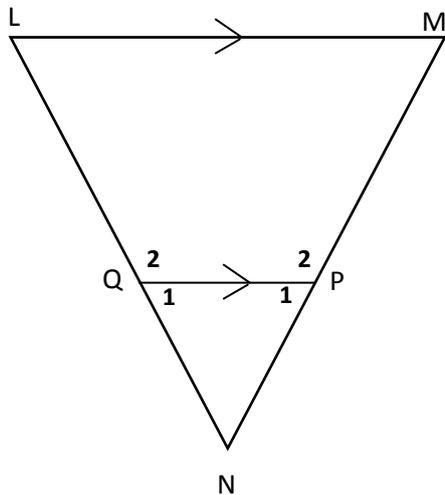
8.4.1 Complete the following (give reasons for the statements):

Prove with reasons that $\triangle QPN \parallel\parallel \triangle LMN$.

In $\triangle QPN$ and $\triangle LMN$

1. $\hat{N} = \ldots\ldots\ldots\ldots$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$

2. $\hat{P}_1 = \ldots\ldots\ldots\ldots$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$

3. $\hat{Q}_1 = \ldots\ldots\ldots\ldots$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$

$\therefore \triangle QPN \parallel\parallel \triangle \ldots\ldots\ldots$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ (4)

8.4.2 Hence, calculate the length of PN.

_____

_____

_____

_____   (3)

[18]

QUESTION 9
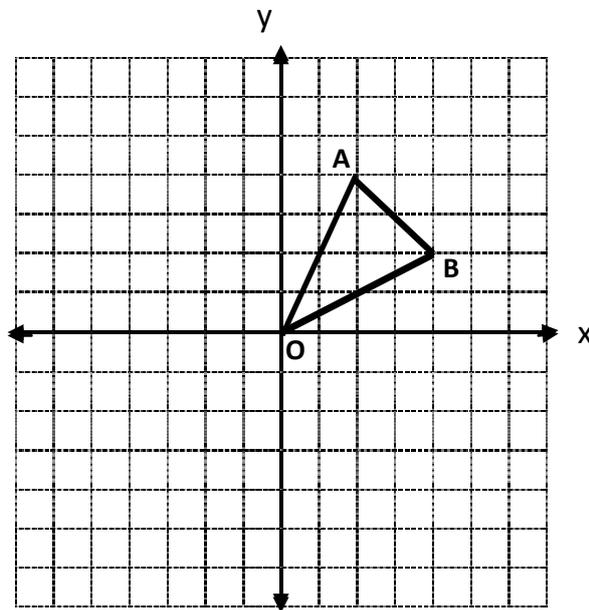
9.1   Use the given grid to draw Δ $A'OB'$, the reflection of Δ AOB in the X-axis.   (2)

9.2   Write down the coordinates of B', the image of B.   (1)

9.3   On the same grid, draw the rotation of ΔAOB through 180° about the origin to

        form Δ$A''OB''$.   (2)

9.4   Hence, determine the length of $A'A''$.   (1)

   **[6]**

QUESTION 10

10.1
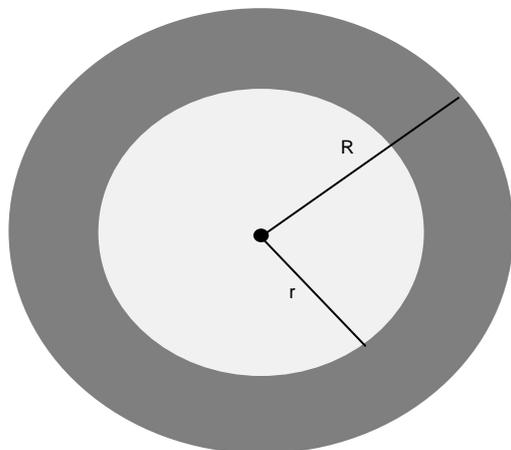
10.1.1 Show that the area of the shaded ring is equal to $\pi(R^2 - r^2)$.

_____

_____ (2)

10.1.2 Determine the area of the shaded ring in terms of π if

$R = 14$ cm and $r = 8$ cm.

_____

_____ (2)

10.2   In the triangular prism below, $\Delta PQT \equiv \Delta PRT, PQ = PR$ and $PT \perp QR$.
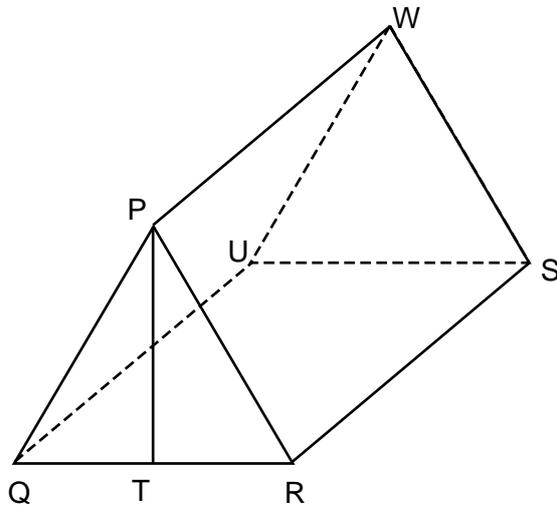
10.2.1   Determine the length of QT if QR = 48 cm. (Give a reason for your answer).

_____   (2)

10.2.2   If $PQ = PR = 25$ cm, show that $PT = 7$cm.

_____

_____

_____

_____   (4)

10.2.3   Hence, calculate the area of ΔPQR.

_____

_____

_____

_____   (3)

10.2.4 Calculate the volume of the prism if $RS = 80$ cm.

_____

_____

_____

_____ (2)

10.2.5 Calculate the surface area of the prism.

_____

_____

_____

_____ (5)

[20]

QUESTION 11

The histogram below illustrates the Mathematics test marks, out of 10, obtained by a Grade 9 class.

f
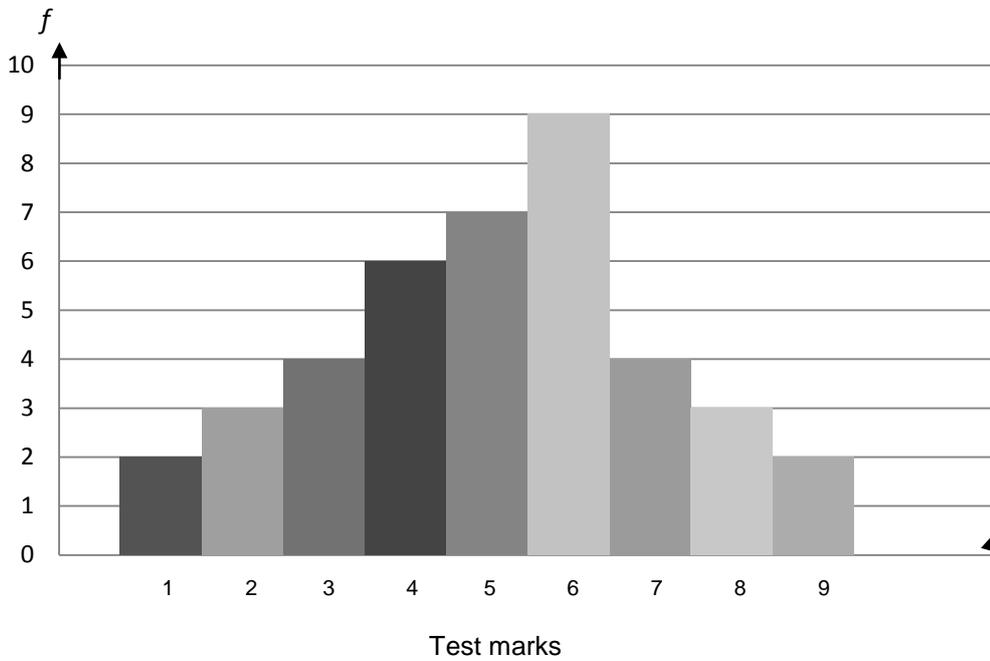
Test marks

11.1   Complete the frequency table for the given histogram.

Mark x	Frequency f	Product $f.x$
1	2	2
2		

(4)

11.2   How many learners were tested?

_____   (1)

11.3   Calculate the mean test mark.

The mean mark = _____

             = _____

             = _____   (3)

11.4   What percentage of the learners obtained 7 or more out of 10 for the test?

_____

_____   (2)
[10]

QUESTION 12

The following are the heights, in centimetres, of a group of Grade 9 learners.

156	147	173	165	170
145	153	165	149	158
163	156	153	157	137
177	146	150	153	158

12.1   Draw a stem-and-leaf plot to illustrate the data.

Stem	Leaves
13	
14	
15	
16	
17	

(5)

12.2   Use the data to complete each of the following:

12.2.1   The range = _____.   (1)

12.2.2   The mode = _____.   (1)

12.2.3   The median = _____.   (1)

12.2.4   The number of learners who are shorter than 160 cm =_____.   (1)
[9]

QUESTION 13

A box contains 3 blue, 4 white and 5 green marbles of the same size.

13.1   If you take out 1 marble, what is the probability that you will take out a green marble?

_____ (1)

13.2   What is the probability of then taking out a white marble if you replace the marble that you took out of the box previously?

_____ (1)

13.3   If you take out a white marble and do not replace it, what is the probability of taking out another white marble?

_____ (1)

[3]

QUESTION 14

The 200 Grade 9 boys in a school play soccer, hockey or both. If 150 boys play soccer and 130 play hockey, calculate how many of them play BOTH soccer and hockey.

_____

_____

_____ (3)

[3]

TOTAL: 140