MARITZBURG COLLEGE

NOVEMBER EXAMINATION

TIME: 2 HRS **MATHEMATICS** **TOTAL: 120**

FORM 3

INSTRUCTIONS:

1. Write **your name**, **your class** (eg. 3W) and **your maths teacher's name** on your answer booklet.
2. All working must be shown from Question 2 onwards.
3. Question 7.1 must be answered on page 11. This must be handed in inside your answer booklet.
4. An approved scientific calculator may be used unless otherwise specified.
5. Diagrams are not drawn to scale.

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

$$y = mx + c \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad y - y_1 = m(x - x_1)$$

$$V = Area\ of\ base \times height \qquad SA = 2(area\ of\ base) + (perimeter\ of\ base) \times height$$

QUESTION 1

Write only the question number and the letter representing the correct answer.

1.1 $5x^0 =$

A) 5
B) 1
C) 0
D) $5x$ (1)

1.2 Consider the polynomial: $4x^3 - 4 + \frac{x}{4}$

A) The degree is 4.
B) It has 4 terms.
C) The constant is 4.
D) The coefficient of x^3 is 4. (1)

1.3 P is a point on the line $y = 3x - 2$.

A) P (3 ; 2)
B) P ($\frac{1}{3}$; -1)
C) P ($\frac{1}{3}$; -2)
D) P (3 ; -2) (1)

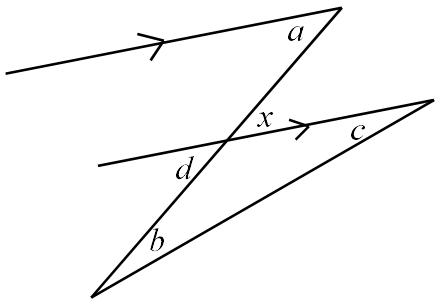
1.4 The common difference in the given pattern 36 ; 29 ; 22 ; … is:

A) 29
B) -7
C) 36 - 29 - 22 = -15
D) 36 – 22 = 14 (1)

1.5 $5^{a+b} =$

A) $5^a + 5^b$
B) $(5^a)^b$
C) $5^a.5^b$
D) 25^{ab} (1)

1.6 Consider the given diagram.
The alternate angle that is equal to x is:



A) a
B) b
C) c
D) d (1)

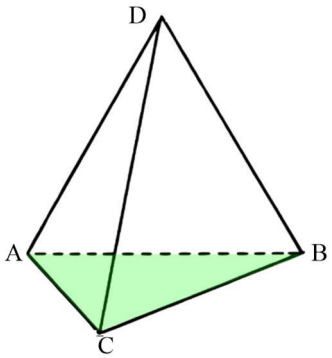
1.7 $(y - 3)^2 =$

A) $-9y^2$
B) $y^2 - 9$
C) $y^2 - 6y + 9$
D) $y^2 + 9$ (1)

1.8 Consider the data given: 8 ; 8 ; 10 ; 11 ; 12 ; 15 ; 18 ; 18 ; 18 ; 22

A) The mean is 14.
B) The median is 14.
C) The mode is 14.
D) The interquartile range is 14. (1)

1.9 In the diagram ABCD is a solid shape with four congruent triangular faces.
Δ ABC has an area of 10 cm^2.
The surface area of the complete shape is:



A) 10 cm^2.
B) 100 cm^2.
C) 104 cm^2.
D) 40 cm^2. (1)

1.10 Consider the properties of a square. Which statement is true?

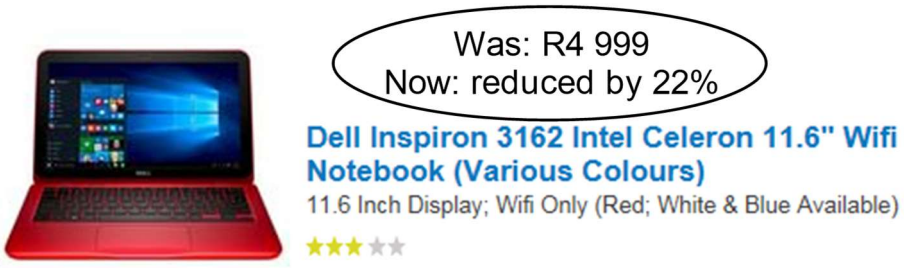
A) A square is a rectangle.
B) A square is a kite
C) A square is not a rhombus.
D) A square is not a parallelogram. (1)

[10]

QUESTION 2

Round all answers in this question off correctly to two decimal places.

2.1 The following computer is currently advertised online:
What is the reduced price of this computer?



(2)

2.2 Your grandparents give you R2 500 for your birthday . Your parents make you invest it until your birthday in matric. How much will it be worth in 3 year's time if it is invested at 7,5% p.a. simple interest? (2)

2.3 Mr and Mrs Sithnar decide to buy a lounge suite that costs R14 999.
They decide to buy it using hire purchase at 18% p.a. in equal monthly payments over 2 years. They pay a deposit of 15%.

2.3.1 How much is the deposit? (1)
2.3.2 What is their monthly instalment? (4)
2.3.3 How much will they pay in interest over the 2 years? (1)

[10]

QUESTION 3

Simplify each of the following expressions:

3.1 $\sqrt{16x^{16}}$ (2)

3.2 $(2x^2)^3 + \frac{4x^8}{x^2}$ (3)

3.3 $(2x-3)(x+4) - x(x-3)$ (4)

3.4 $\frac{2x^2-4x}{2x}$ (2)

[11]

QUESTION 4

Factorise the following fully:

4.1 $5xy^2 + 10xy$ (2)

4.2 $3x^4 - 3$ (4)

[6]

QUESTION 5

5.1 Solve for x:

5.1.1 $5 + 3x = 26$ (2)

5.1.2 $\frac{x}{2} - \frac{4-x}{10} = \frac{x-3}{5}$ (4)

5.1.3 $x^2 - 11x - 12 = 0$ (4)

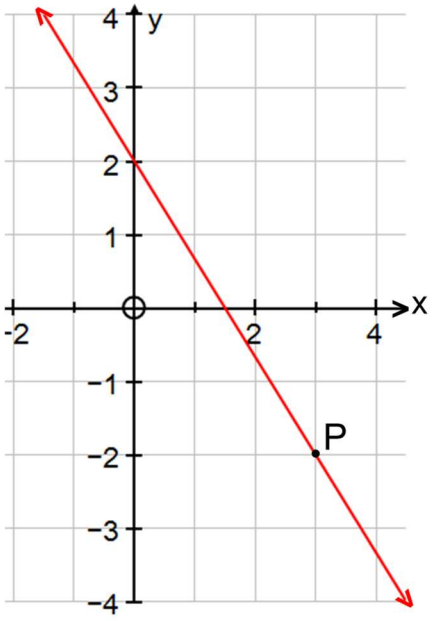
5.1.4 $4x - 3 \geq x + 6$ (2)

5.2 The ages of the three children in my family total 32 years. My sister is twice as old as me and my brother is two years older than my sister. How old am I? Write an equation and solve it, in order to answer this question. (4)

[16]

QUESTION 6

Consider the graph alongside.



6.1 Write down the coordinates of:

6.1.1 the y-intercept. (1)

6.1.2 point P. (1)

6.2 Write down the gradient of the graph. (1)

6.3 Write down the equation of the graph. (1)

6.4 Write down the equation of the line that goes through P and is perpendicular to the x-axis. (1)

[5]

QUESTION 7

7.1 Draw the following graphs ***on the given Cartesian Plane*** on page 11.
Detach page 11 and hand it in inside your answer booklet.
Show the relevant points and label the graphs correctly.

A. $3x - 4y = 12$

B. $y = 2x + 1$ (4)

7.2 Find the equation of the straight line that goes through the points (2;5) and (5;-4). (4)

[8]

QUESTION 8

8.1 Match each statement below with one option in the frame. Each letter can only be used once. *Write only the question number and the correct letter.*

8.1.1 Only 1 diagonal is bisected. (1)

8.1.2 SSS (1)

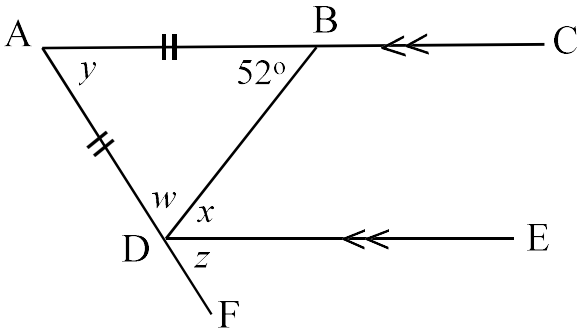
8.1.3 15º and 75º. (1)

8.1.4 The diagonals bisect each other. (1)

8.1.5 Co-interior angles on parallel lines. (1)

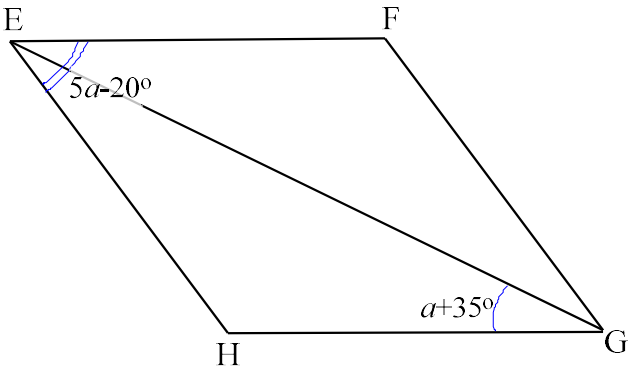
A.	Complementary angles
B.	Trapezium
C.	Congruent triangles
D.	Supplementary angles
E.	Vertically opposite angles
F.	Kite
G.	Similar triangles
H.	Rectangle

8.2 Find the value of each of the variables in the diagram below.
Give a reason for each answer.



(8)

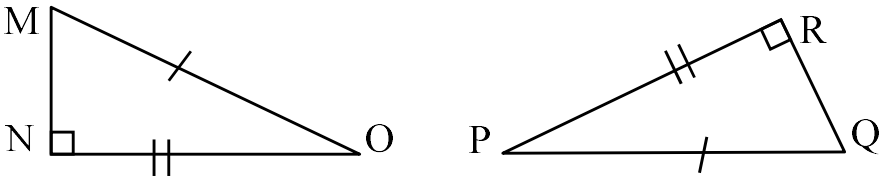
8.3 In the diagram alongside EFGH is a rhombus.
$H\hat{E}F = 5a - 20^o$.
$E\hat{G}H = a + 35^o$.
Calculate, with reasons, the value of a.



(4)
[17]

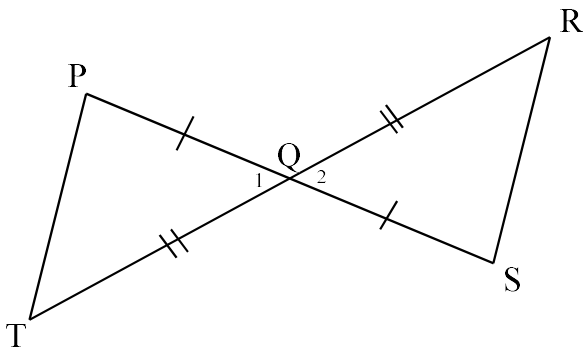
QUESTION 9

9.1 Give the reason why Δ MNO ≡ Δ QRP.



(1)

9.2 Consider the diagram alongside.

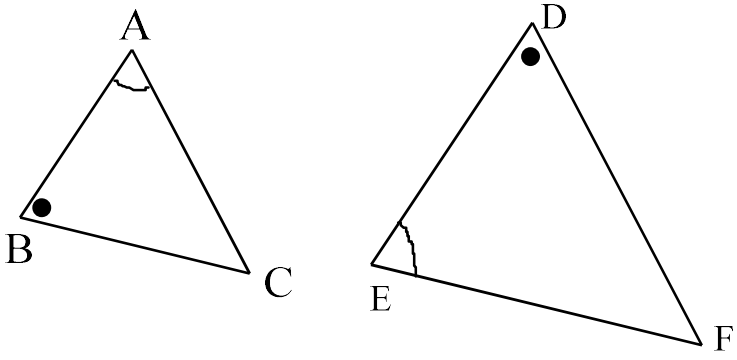


Prove that:

9.2.1 $\Delta PQT \equiv \Delta SQR$ (4)

9.2.2 $PT \parallel RS$ (2)

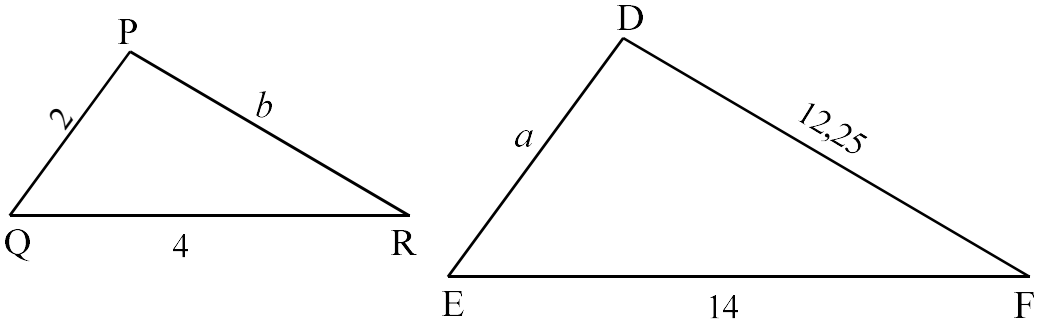
9.3 The two triangles below are similar.



Copy and complete the similarity statement below, with the correct reason:

$\Delta ABC \vert\vert\vert \Delta$ ….. (…..) (2)

9.4 In the triangles below $\Delta PQR \vert\vert\vert \Delta DEF$.
Calculate the values of *a* and *b*.

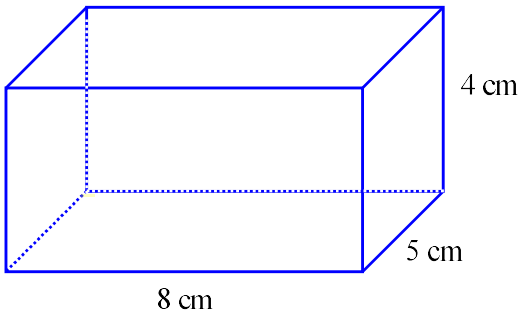


(4)

[13]

QUESTION 10

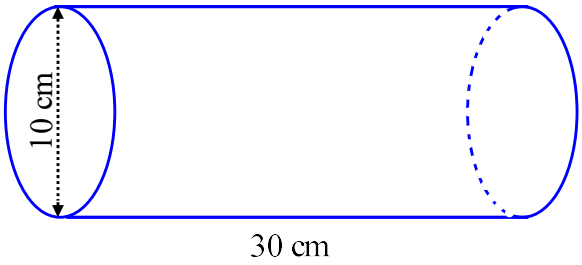
10.1 Consider the closed right rectangular prism alongside. Calculate its:



10.1.1 volume. (2)

10.1.2 total surface area. (3)

10.2 In the closed cylinder below, the diameter is 10 cm and its length is 30 cm. Write all answers in this question correct to 2 decimal places.



10.2.1 Find the area of the circular base. (3)

10.2.2 Find the circumference of the circular base. (1)

10.2.3 Find the total surface area of the cylinder. (2)

[11]

QUESTION 11

Consider the data in the stem and leaf diagram given below. It represents marks a group of friends got for a exam out of 150.

Stem	Leaves
10	1 ; 7
11	
12	3 ; 3 ; 6 ; 8 ; 9
13	0 ; 4 ; 4 ; 4 ; 5
14	9

11.1 What is the range of the data? (1)

11.2 What is the mode of the data? (1)

11.3 Find the lower and upper quartiles of the data. (2)

11.4 Write down the interquartile range of the data. (1)

[5]

QUESTION 12

Leave your answers as fractions in simplest form for this question.

12.1 There are 15 lucky dip packets.
5 packets have fidget spinners in them.
3 packets have yoyos in them and the rest have a small bouncing ball in them.

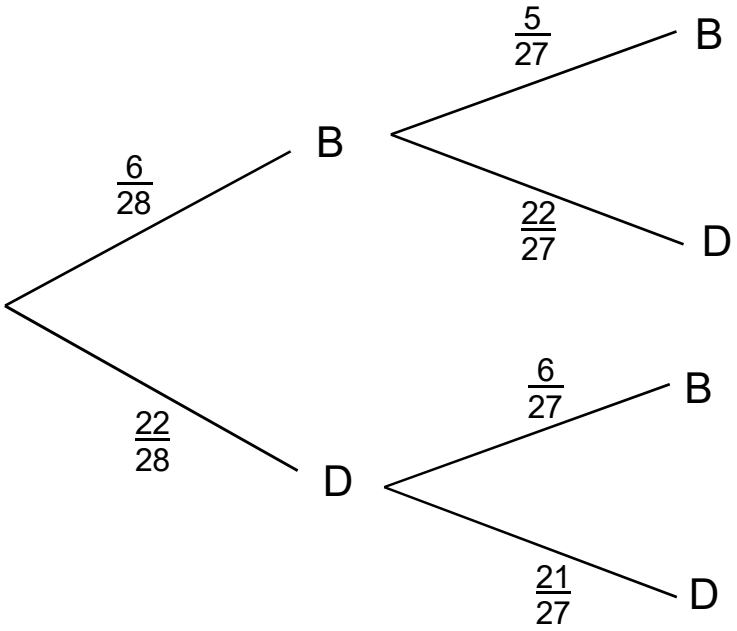
12.1.1 Determine the probability of the first packet chosen having:

(a) a bouncing ball? (1)

(b) a fidget spinner or a yoyo or a bouncing ball? (1)

12.1.2 If the first packet taken has a fidget spinner in it, what is the probability that the second packet chosen will also have a fidget spinner? (1)

12.2 In a class there are 6 boarders (B) and 22 dayboys (D). The teacher randomly picks a boy to help carry equipment and then realises one boy isn't enough and randomly picks another one to help. This is illustrated in the tree diagram below.



Use the tree diagram to calculate the probability that the teacher chose:

12.2.1 two boarders. (2)

12.2.2 a boarder and a dayboy in any order. (3)

[8]

NAME:_____ CLASS:_____

MATHS TEACHERS NAME:_____

QUESTION 7.1