

Centre Number	Candidate Number

Candidate Name _____

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level

Mathematics

4024/1

Paper 1

Tuesday

31 JULY 2018

Candidates answer on the question paper

Additional materials:
Geometrical instruments

Time: 2 hours

Instructions to Candidates

Write your **name, centre number and candidate number** in the spaces provided at the top of this page.

There are **twenty-three** questions in this paper.

Answer **all** questions.

Write your answers in the **spaces provided** on the question paper.

If working is needed for any question, it must be shown in the space below that question.

No paper for rough work is to be provided.

Omission of essential working will result in loss of marks.

Electronic calculators and mathematical tables should not be used in this paper.

Cell phones are not allowed in the examination room.

Information for Candidates

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 80.

For Examiner's Use

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1 Simplify $4(x + 2y) - (3x - 8y)$.

Answer: [2]

2 Evaluate $27^{\frac{2}{3}}$.

Answer: [2]

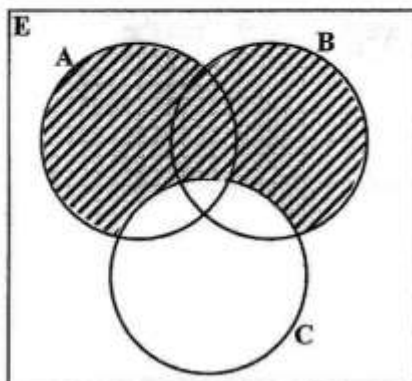
3 A straight line passing through A(3, 2) and B(5, y) has gradient -2 . Find the value of y.

Answer: [2]

4 Factorise completely $5x^2 - 5$.

Answer: [2]

5 Use set notation to describe the shaded region in the Venn diagram below.



Answer: [2]

6 Given that $C = \begin{pmatrix} 5 & -1 \\ 2 & 1 \end{pmatrix}$ and $D = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$, express CD as a single matrix.

028

Answer: [2]

7 The first three terms in an arithmetic progression are 5, 7 and 9. Find the

- (a) common difference,
- (b) sum of the first 12 terms.

024

Answer: (a) [1]

(b) [2]



- 8 (a) In a game, the probability of a player losing is 0.3. What is the probability of a player winning the game?
- (b) The coordinates of B and C are (2, 5) and (4, -3) respectively. If M is the mid-point of BC, what is the position vector of M?

Answer: (a) [1]

(b) [2]

- 9 (a) Given that $E = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{1, 2, 3, 4\}$ and $B = \{2, 3, 4, 5, 6\}$, list $(A \cup B)'$.
- (b) The scale of a map is 1 : 20 000. The actual area of residential plots is 60km^2 . Calculate the area of residential plots on the map in **square centimetres**.

Answer: (a) [1]

(b) [2]



- 10 (a) The difference in longitude between town A and town B is 105° . B is west of A. A family at A was watching a football match at 16 00 hours. At what time did a family at B watch the same match?
- (b) The distance between P and Q is 3 600nm. If an aeroplane flies from P to Q at 600 knots, how long will it take?

Answer: (a) [1]

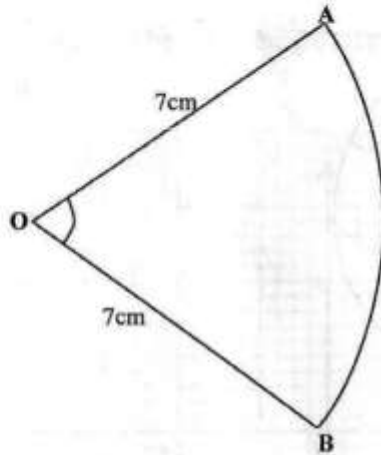
(b) [2]

- 11 (a) The transpose of a matrix P is $\begin{pmatrix} 1 & 3 & 4 \\ 2 & 5 & 1 \\ 3 & 0 & 1 \end{pmatrix}$. Write down the matrix P.
- (b) Solve the equation $2^{2x-1} = 16^{-2x}$.

Answer: (a) [1]

(b) [2]

- 12 (a) The diagram below shows a sector AOB of a circle with centre O and radius 7cm.
The area of the sector is $25\frac{2}{3} \text{ cm}^2$. $[\pi = \frac{22}{7}]$



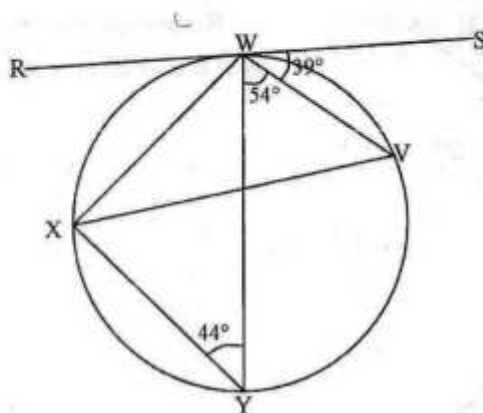
Calculate \widehat{AOB} .

- (b) Ngiwezi invested K14 500.00 in a business firm. The condition was that if she left her shares in the firm for 12 months, a profit of 5% would be added to her shares. How much will she get at the end of 12 months?

Answer: (a) [2]

(b) [2]

- 13 The diagram below shows a circle with a tangent RWS. The points V, W, X and Y are on the circle such that $\widehat{XYW} = 44^\circ$, $\widehat{VWY} = 54^\circ$ and $\widehat{SWV} = 39^\circ$.



Calculate

(a) \widehat{RWX} ,

(b) \widehat{XVW} ,

(c) \widehat{YXW} .

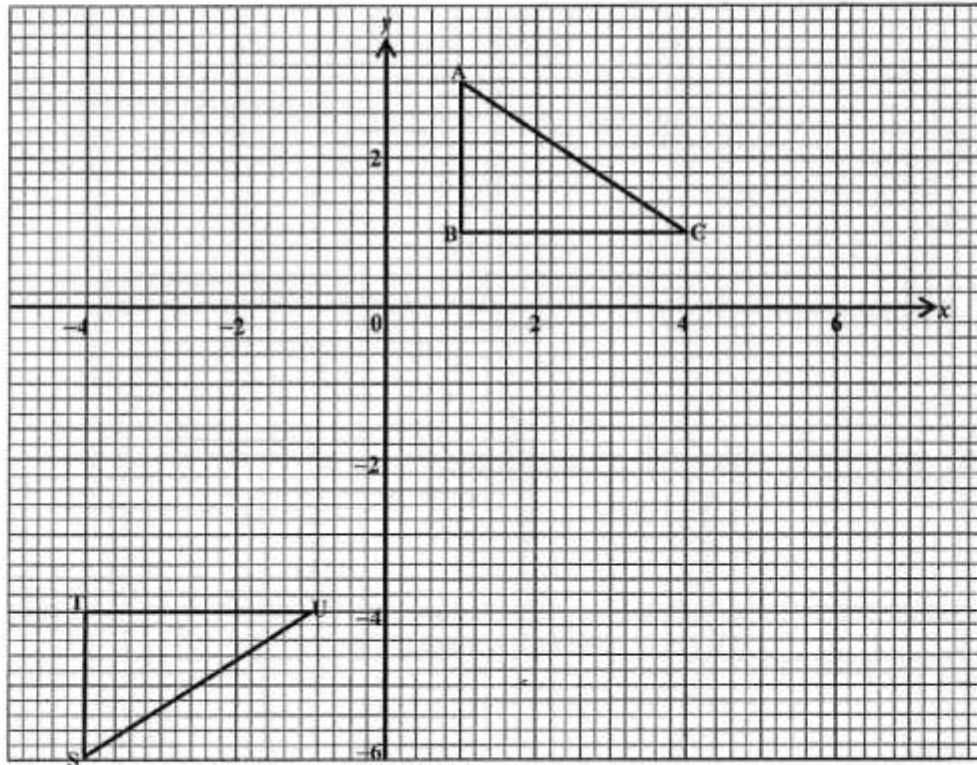
Answer: (a) [1]

(b) [1]

(c) [2]



- 14 (a) The ratio of the heights of two containers that are geometrically similar is 2:3. If the surface area of the smaller container is 80cm^2 , find the surface area of the larger container.
- (b) In the diagram below, triangle ABC is mapped onto triangle STU by a combined transformation.



Name the two transformations that map triangle ABC onto triangle STU.

Answer: (a) [2]
 (b)
 [2]

1208

1024



15 Two variables x and y have corresponding values as shown in the table below.

x	2	3	a
y	20	40	104

Given that y varies directly as $(x^2 + 1)$, find the

- (a) constant of variation, k ,
- (b) equation connecting y and x ,
- (c) values of a .

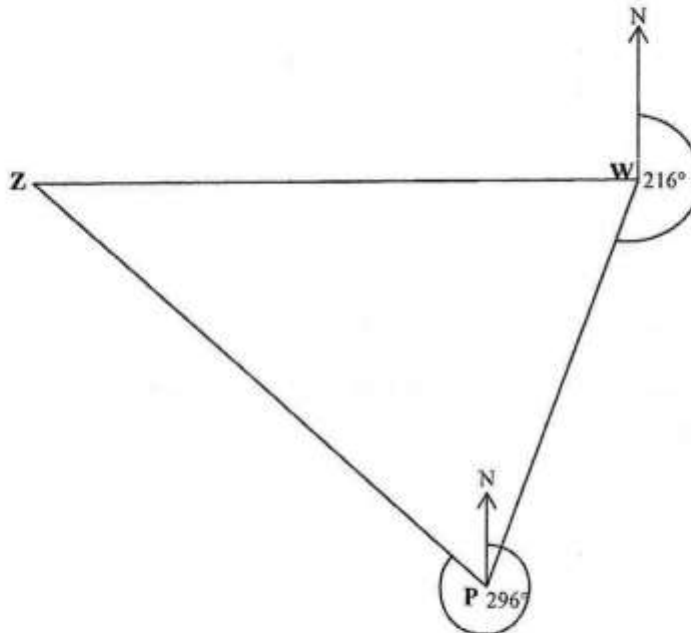
Answer: (a) [1]
 (b) [1]
 (c) [2]

16 Given that $f(x) = 8x$ and $g(x) = \frac{3x-2}{4}$, find

- (a) $f^{-1}(x)$,
- (b) an expression for $fg(x)$,
- (c) the value of x for which $fg(x) = 20$.

Answer: (a) [1]
 (b) [2]
 (c) $x =$ [1]

- 17 In the diagram below, a cyclist starts from town W and cycles on a bearing of 216° to town P. She then leaves town P and cycles on a bearing of 296° to Z. Z is west of W.

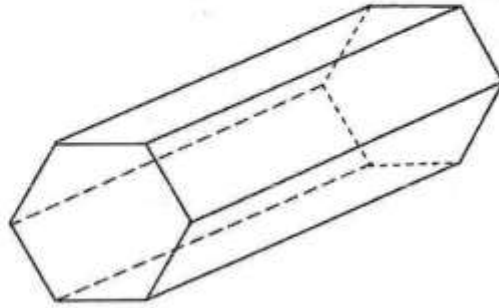


Calculate

- (a) $\hat{P}WZ$,
(b) $\hat{W}PZ$.

Answer: (a) [2]
(b) [2]

- 18 (a) The diagram below shows a regular hexagonal prism.



State the number of planes of symmetry.

- (b) A piece of timber measures 5.25cm long. Calculate the relative error of the measurement.

Answer: (a) [2]

(b) [2]

- 19 (a) Integrate $3x^4 - 4x^{-3}$ with respect to x .

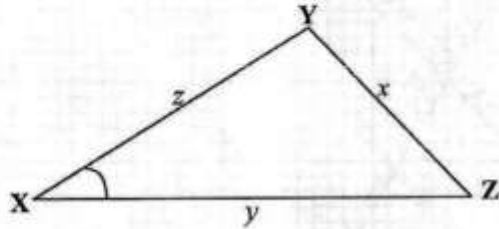
- (b) Solve the equation $(2x - 1)^2 = 25$.

Answer: (a) [2]

(b) [2]

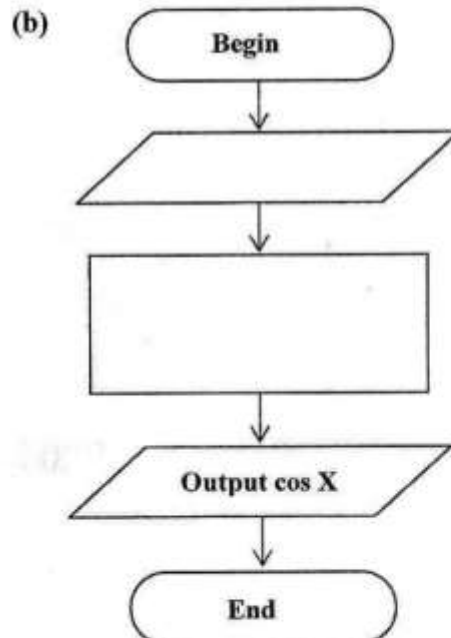


- 20 (a) Find the equation of a line which is parallel to $2x + y = 3$ passing through $(-2, 3)$.
- (b) The diagram in the answer space below is an incomplete flow chart to calculate $\cos X$ for the triangle shown below.



Complete the flow chart below by writing the appropriate statements in the blank symbols.

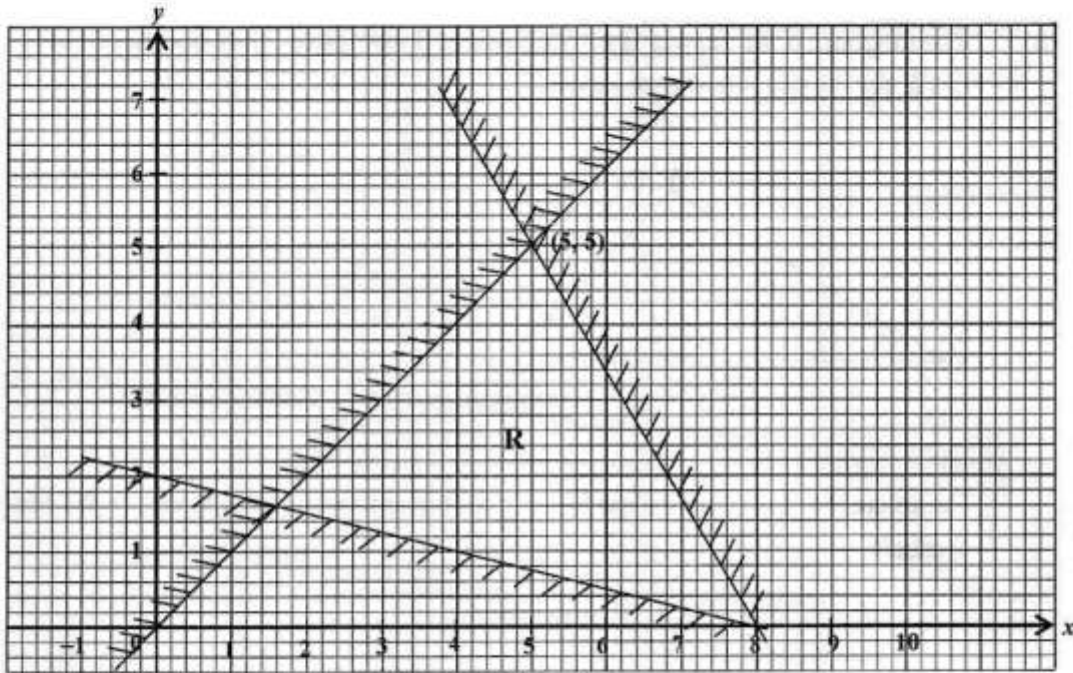
Answer: (a)..... [2]



[2]



21 In the diagram below, **R** is the unshaded region.



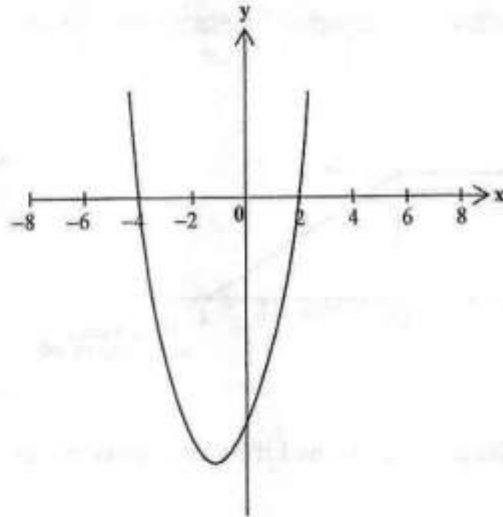
Write three inequalities which describe the region **R**.

Answer:

.....

[5]

- 22 (a) Given a right angled triangle XYZ where $\angle Z$ is 90° and $\sin X = \frac{4}{5}$, find the value of $\cos X$.
- (b) The diagram below shows a sketch of a graph which meets the x-axis at -4 and 2 .



Find the

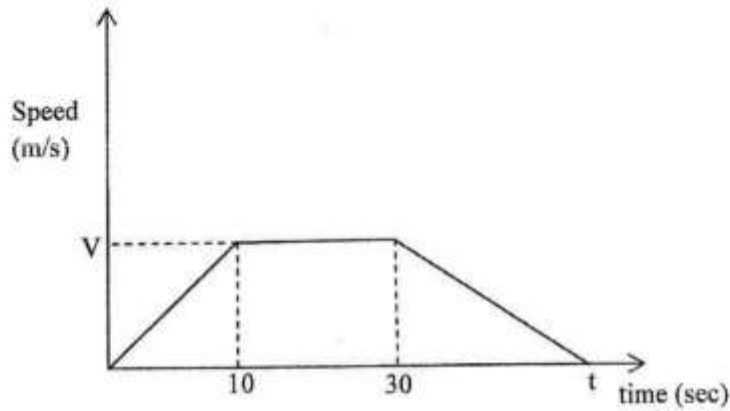
- (i) equation of the graph,
- (ii) coordinates of the turning point.

Answer: (a) [2]

(b) (i) [2]

(ii) [2]

- 23 The diagram below shows the speed-time graph of a particle. The particle started off from rest and accelerated uniformly for 10 seconds. It then travelled at a constant speed for 20 seconds and then decelerated to rest.



- (a) Find the speed V the particle reached if its acceleration was 2m/s^2 in the first 10 seconds.
- (b) Given that the total distance covered was 750m, find the value of t in the diagram.
- (c) What was the speed at 40 seconds?

Answer: (a) [2]
(b) [2]
(c) [2]