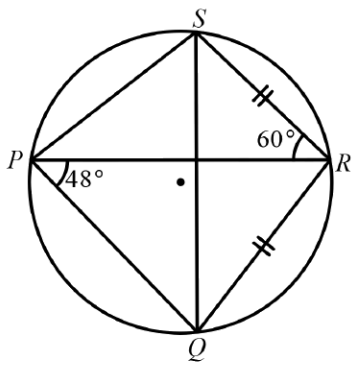
1. (a) Solve correct to one decimal place, $\tan(\theta + 25^\circ)$, where $0^\circ \leq \theta \leq 90^\circ$.
   (b) In the relation $t = m\sqrt{n^2 + 4r}$,
      i. make n the subject of the relation.
      ii. find the positive value of n when $t = 25$ $m = 5$ and $r = 4$.

2. The first three terms of an Arithmetic Progression (A.P) are $(x + 1), (4x - 2)$ and $(6x - 3)$ respectively. If the last term is 18 find the:
   (a) value of x.
   (b) sum of the terms of the progression.

3. The angle of a sector of a circle with radius 22cm is 60°. If the sector is folded such that the straight edges coincide, forming a cone, calculate, correct to one decimal place, the:
   (a) radius;
   (b) height;
   (c) volume; of the cone. [Take $\pi = \frac{22}{7}$]

4. (a) In how many years will GHC 312.50 invested at 4% per annum simple interest amount to GHC 500.00?
   (b)



   In the diagram, $PQRS$ is a cyclic quadrilateral. If $|SR| = |RQ|, \angle SRP = 65^\circ$ and $\angle RPQ = 48^\circ$, find $\angle PRQ$.

5. (a) The probabilities that James and Juliet will pass an examination are $\frac{3}{4}$ and $\frac{3}{5}$ respectively. Find the probability that both will fail the examination.
   (b)

Balls	Green	Blue
New	8	2
Old	4	6

   The table shows the distribution of balls in bag. If 2 balls are selected at random with replacement, find the probability of selecting either 2 new green balls or 2 old blue balls.

6. (a) If $9^x \times 3^{2y} = \dfrac{1}{729}$, and $2^{-x} \times 4^{-y} = \dfrac{1}{8}$, find the values of x and y.
   (b) Two commodities **X** and **Y** D70.00 and D80.00 per kg respectively. If 34.5 kg of **X** is mixed with 26kg of **Y** and the mixture is sold at D85.00 per kg. calculate the percentage profit.

7. (a) Copy and complete the following table for the relation: $y = 2(x+2)^2 - 3$ for $-5 \leq x \leq 2$.

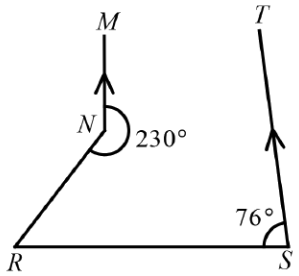
x	-5	-4	-3	-2	-1	0	1	2
y			-1	-3		5		

   (b) Using scales of 2cm to 1 unit on the x -axis and 2cm to 5 units on the y -axis, draw the graph of the relation $y = 2(x + 2)^2 - 3$ for $-5 \leq x \leq 2$.

(c) Use the graph to find the solution of:
   i. $2(x+2)^2 = 3$
   ii. $2(x+2)^2 = 5$

(d) For what values of x, from the graph is y increasing in the interval?

8. (a)



In the diagram, $MN \parallel ST, \angle MNR = 230°$ and $\angle TSR = 76°$. Find the value of $\angle NRS$.

(b) i. Copy and complete the tables for the addition $\oplus$ and multiplication $\otimes$ in modulo 5.

$\oplus$	1	2	3	4
1	2	3	4	0
2	3			
3	4			2
4	0			

$\otimes$	1	2	3	4
1	1	2	3	4
2	2			
3				2
4				1

ii. Use the tables to find:
   α. $4 \otimes 2 \oplus 3 \otimes 4$;
   β. m such that $m \otimes m = m \oplus m$;
   γ. n such that $3 \oplus n = 2 \otimes n$.

9. (a) If $16^n = \sqrt[3]{2^2}$, find the value of n.

(b) The perimeter of a square and a rectangle is the same. The width of the rectangle is 6cm and its area is 16cm^2 less than the area of the square. Find the area of the square.

10. The table shows the distribution of marks scored by 500 candidates in an examination.

Marks	$0-9$	$10-19$	$20-29$	$30-39$	$40-49$
Frequency	10	28	40	92	$y+60$
Marks	$50-59$	$60-69$	$70-79$	$80-89$	$90-99$
Frequency	90	50	30	15	5

(a) Find the value of y.

(b) Construct a cumulative frequency table and use it to draw a cumulative frequency curve.

(c) Use the curve to estimate the probability of selecting a candidate who scored not more than 45%.

11. The angle of elevation of the top, X, of a vertical pole from a point, W, on the same horizontal ground as the foot, Z, of the pole is $60°$. If W is 15km from X and 12km from a point Y on the pole,

(a) illustrate this information with a diagram.

(b) calculate, correct to two decimal places. the:
   i. angle of elevation of Y from W;
   ii. length, XY.

12. (a) Using scales of 2cm to 2 units on both axes, draw on a sheet of graph paper two perpendicular axes $0x$ and $0y$ for $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$.

(b) Given point $E(3,2), F(-1,5)$ and the vectors $\overrightarrow{FG} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ and $\overrightarrow{GH} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$, find the coordinates of the points G and H.

(c) Draw, on the same graph, indicating clearly the vertices and their coordinates, the

i. quadrilateral $EFGH$;

ii. image $E_1F_1G_1H_1$ of the quadrilateral $EFGH$ under an anticlockwise rotation of 90° about the origin where $E \to E_1$ $F \to F_1, G \to G_1$ and $H \to H_1$.

(d) The side E_1F_1 of the quadrilateral $E_1F_1G_1H_1$ cuts the x -axis at the point P. Calculate correct to one decimal place, the area of $E_1H_1G_1P_1$.

13. (a) Given that $\mathbf{P} = \begin{pmatrix} y & 8 \\ 3 & 2 \end{pmatrix}, \mathbf{Q} = \begin{pmatrix} -3 & -5 \\ -4 & x \end{pmatrix}$ and $\mathbf{PQ} = \mathbf{R}$, find the values of x, y and z.

(b) i. Draw on a graph paper, using a scale of 2cm to 1 unit on both axes, the lines $x = 1; y = 2$; and $x + y = 5$.

ii. Shade the region which satisfies simultaneously the inequalities $x + y \leq 5; y \geq 2$ and $x \geq 1$.