

## DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1969

## MATHEMATICS (NEW SYLLABUS)

## PAPER I

WEDNESDAY, 11th JUNE - 9.30 to 11.30 a.m.

Answer four questions

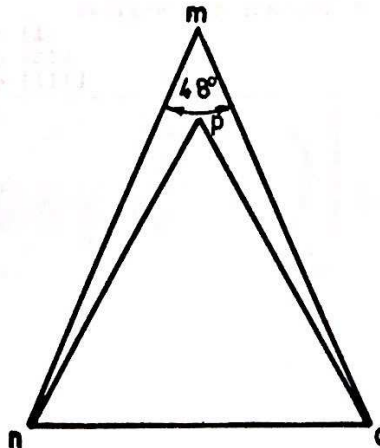
(All questions carry equal marks)

1. (a) Express the binary number 1101 in denary form.  
 (b) Change the denary number 25 into its corresponding binary number.  
 (c) Add the following binary numbers in the binary system:  $11001 + 10101$   
 (d) Multiply in the binary system the following binary numbers:  $1101 \times 101$ .
2. (a) Express the following numbers in standard scientific notation (i.e., in the form  $a \times 10^n$ , where  $n$  is an integer and  $1 \leq a < 10$ ):  
 (i) 0.52, (ii) 0.00014, (iii) 91,000,000.  
 Simplify:  $\frac{0.52 \times 0.00014}{91,000,000}$  without using tables and express its value in the standard scientific notation.  
 (b) Evaluate:  $(25.4)^2 (1.02) \sqrt{\frac{(8.71)^3}{545}}$  using either logarithms or a slide rule.  
 (c) By using a method of approximation or otherwise calculate, without using tables or slide rule, the square root of 54, correct to 3 significant figures.
3. (a) Find the angle whose sine is (i) 0.9361, (ii) 0.2571.  
 (b) Find the value of  $\frac{3}{2} (\sin 23^\circ 36' + \cos 32^\circ 24')$ .  
 (c) A vertical tower standing on level ground casts a shadow 120 ft long and at the same time a 20 ft vertical telegraph pole standing on level ground casts a shadow 15 ft long. Find the height of the tower in ft. Find also the distance of the top of the tower from its corresponding point on the shadow.
4. (a) Prove that the sum of the three internal angles of any triangle is  $180^\circ$ .

- (b) In the given diagram  
 $|np| = |po| = |no|$ ,  
 $|mn| = |mo|$   
 and the angle  $nmo$  is  $48^\circ$ .

Calculate the angles:

- (i)  $pno$ ,  
 (ii)  $mno$ ,  
 (iii)  $mnp$ ,  
 and (iv)  $npo$ .

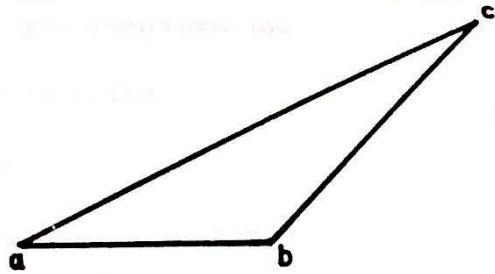


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5. (a) Draw any two geometrical figures which have one and only one axis of symmetry. Indicate the axis of symmetry in each case by use of a broken or dotted line.

(b) Copy the triangle  $abc$  into your answer book and draw its images under the following translations:

(i)  $\vec{ab}$ , (ii)  $\vec{bc}$ .



(c) L A N  $\triangle$  T  $\nabla$  E M F



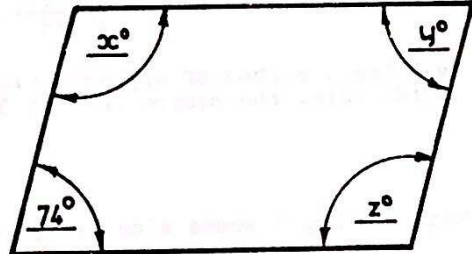
Copy the diagram drawn above into your answer book and sketch the reflection of each of the figures in the line  $ab$ . (A neat freehand sketch will be sufficient.)



6. (a)  $ab$  and  $cd$  are equal and parallel line segments. Prove that the line segments  $ac$  and  $bd$  are also equal and parallel.



(b) Calculate the values of the unknown angles  $x^\circ$ ,  $y^\circ$ , and  $z^\circ$  in the parallelogram drawn, if the known angle is  $74^\circ$ .



7. (a) Prove that the sum of the two opposite angles of a cyclic quadrilateral is equal to two right angles.

(b)  $a, b, c, d$  are points on the circumference of a circle, centre  $o$ , and  $e$  is a point on  $cd$  produced. If the angle  $aoc$  as drawn is  $150^\circ$ , calculate the angles:

- (i)  $\angle adc$ ,
- (ii)  $\angle abc$ ,
- (iii)  $\angle aed$ .

