

CERTIFICATE EXAMINATION FOR DAY VOCATIONAL COURSES, 1965.

M A T H E M A T I C S .

WEDNESDAY, 16th JUNE—10 a.m. to 1 p.m.

INSTRUCTIONS.

- (a) Attempt question 1 and six others.
- (b) The marks allotted to each question are shown in brackets.
- (c) Mathematical Tables and in in. graph paper are supplied.
- (d) Special credit will be given to candidates who display neatness and order in answering.
- (e) All the work must be shown in the answer book.

1. (a) Using the tables supplied (where necessary), write down: $\log 0.043$, $\log 10^{1.37}$, $\text{antilog } 1.53$, $\text{antilog } 3$.
- (b) A dealer bought x eggs at y shillings per dozen and sold them at z shillings per score. Write expressions for (i) his profit, (ii) his profit per cent.
- (c) Find the value of $2.72^2 - 1.573^2$ correct to two places of decimals.
- (d) A triangle ABC is right-angled at B. Prove that $\sin^2 A + \cos^2 A = 1$.
- (e) If $A = 2H(L + B)$, find B in terms of A, H and L and calculate its value when $A = 416$, $H = 8$ and $L = 14$.
- (20 marks)

2. Simplify: (a) $\frac{5\frac{1}{2} \text{ of } 3\frac{1}{7} + 3\frac{1}{2}}{2\frac{1}{2} - 4\frac{1}{8} \div 3\frac{1}{3}} - 2$. (b) $\frac{a^3 + b^3}{a^2 - b^2} \times \frac{a^2 + ab - 2b^2}{a^2 - ab + b^2} \div \frac{a^2 + 2ab}{a^3}$
- (12 marks)

3. Show how to construct geometrically a tangent to a circle from an external point.

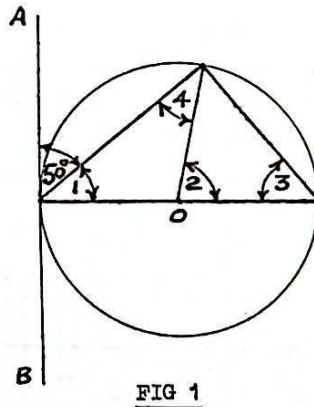


FIG 1

AB is a tangent to the circle whose centre is O (Fig. 1). Without using a protractor, find the number of degrees in each of the angles 1, 2, 3 and 4.

(12 marks)

4. (a) Evaluate, using logarithms: $\sqrt{\frac{875 \times 0.0057}{(1.37)^3}}$
- (b) If $x = a \sqrt[3]{\frac{b}{c}}$ then $\log x = \dots\dots\dots$
- (12 marks)

5. Solve the equations:-

(i) $\frac{x}{0.5} - \frac{3x - 1.5}{0.25} = 1$

(ii) $2x + y = 3x - \frac{y}{2} = 8$

(iii) $x^2 - 16x = 0$

(12 marks)
over-

6. Solve the equation $2x^2 - 3x = 2$
 (a) by the method of factorisation,

(b) by completing the square.

(12 marks)

7. The dimensions of an iron washer are: external diameter 2.5 cm., internal diameter 1.0 cm., thickness 2 mm.

How many such washers would weigh 594 grams? (Iron weighs 7.2 gms. per c.c.; $\pi = 3\frac{1}{7}$)

(14 marks)

8. By drawing suitable triangles and making any necessary calculations, show that $\tan 45^\circ$ is greater than $\tan 30^\circ$ and less than $\tan 60^\circ$.

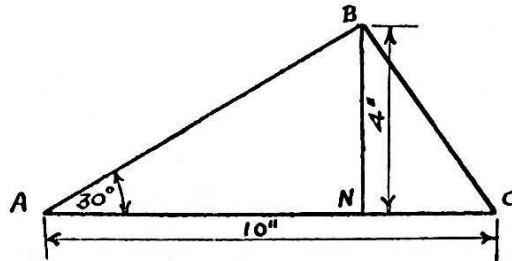


FIG. 2

In the triangle ABC (Fig. 2), BN is perpendicular to AC. Calculate (i) the magnitude of the angle C, (ii) the length of NC, (iii) the length of BC.

(14 marks)

9. In an experiment to find the relationship between two quantities x and y the following values were obtained:-

x	1.5	2.8	3.5	4.2	5
y	4.6	7.2	8.6	10	11.5

Set out these results in the form of a graph and from the graph determine (i) the value of y when $x = 2$, (ii) the law of the graph in the form $y = mx + c$.

(14 marks)

10. The triangle ABC in Fig. 3 is drawn on $\frac{1}{10}$ in. squared paper.

(a) What are the co-ordinates of the points A, B and C?

(b) Calculate the area of the triangle ABC in square inches.

(14 marks)

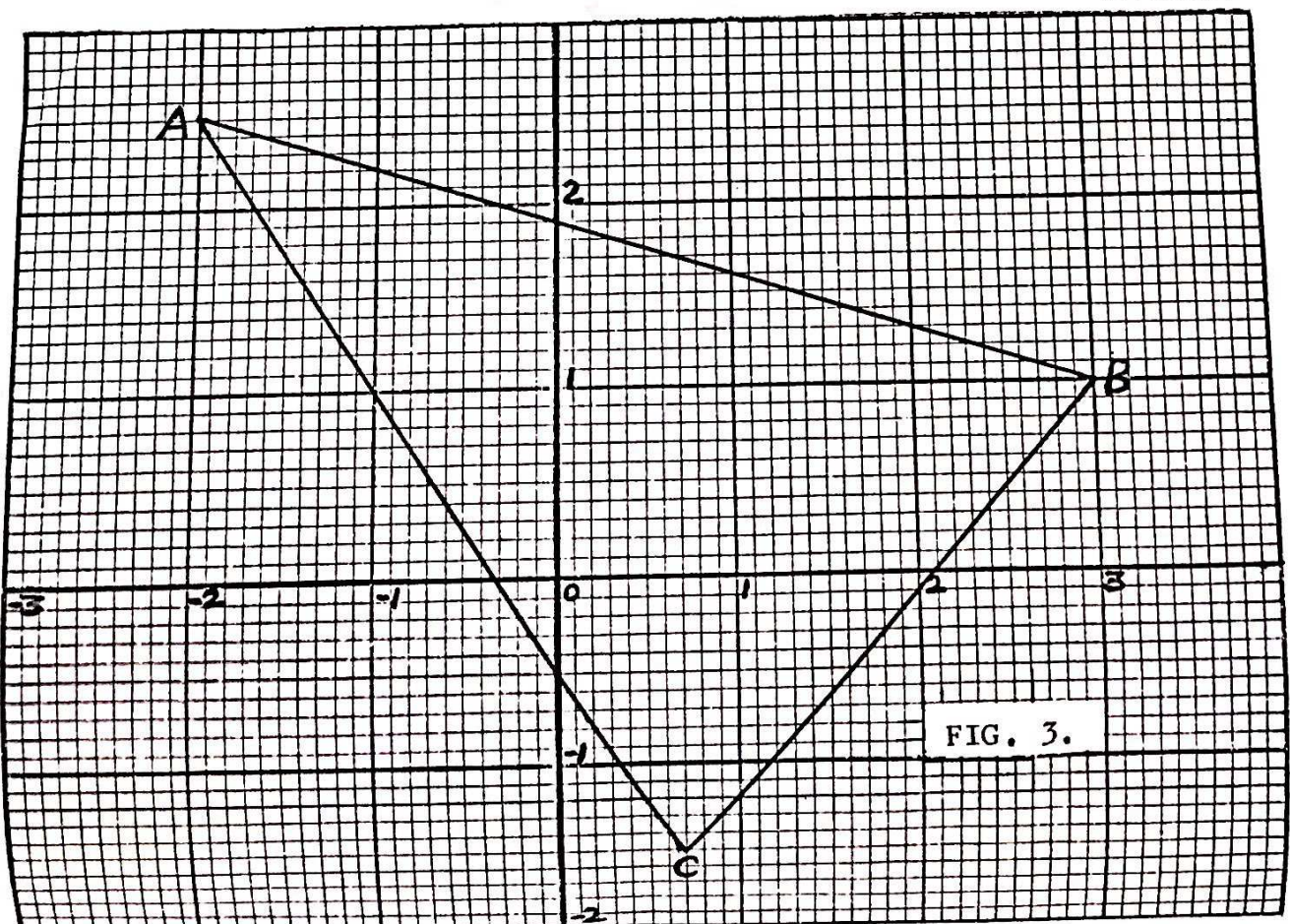


FIG. 3.