

AN ROINN OIDEACHAIS.

BRAINSE AN GHAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1959.

MATHEMATICS.

Thursday, 18th June.—10 to 1 p.m.

INSTRUCTIONS.

- (a) Attempt Question 1 and six others.
 (b) The marks allotted to each question are shown in brackets under.
 (c) Mathematical Tables 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) Simplify : $\left(8\frac{3}{4} \div \frac{6\frac{4}{5} + 9\frac{1}{2}}{12 - 11\frac{5}{7}}\right) \times 6\frac{1}{2}\frac{3}{5}$

(b) Using any short methods you know evaluate

$$\frac{(6 \cdot 5)^2 + (3 \cdot 5)^2}{(6 \cdot 5)^2 - (3 \cdot 5)^2}.$$

Give your answer correct to two decimal places.

(c) From the equation $W = EI - RI^2$, find the value of E when $W = 60$, $R = 5$ and $I = 2$.

(d) Find the cost of 3 tons 12 cwt. 3 qrs. of coal at £8 15s. per ton.

(e) Factorise :

(i) $x^2 - 6x + 8$; (ii) $8x^3 - 27y^3$.

[20 marks.]

2. The price charged by a contractor for building a house was calculated on the basis of £900 for materials, £975 for wages, together with 20% of the total cost of materials and wages as *estimated* profit. When the work was carried out the cost of materials had decreased by 10% and the cost of wages increased by $7\frac{1}{2}$ %. What *actual* profit did the contractor make on the job?

[10 marks.]

3. An attendance of 39 students at a particular class represents 100% attendance. Draw a graph to show the relation between actual attendance and percentage attendance. *From your graph*, find the percentage attendance on days when 21 and 37 students were present, respectively. Check your result by a calculation in each case.

[10 marks.]

4. (a) Using the book of tables supplied, write down the value of each of the following:— log 100.6; log 0.008602; antilog 0.9004; antilog $\bar{2}.9248$.

(b) Evaluate using logarithms:

$$\frac{297.2\sqrt{0.03802}}{10.51 (0.5051)^2}$$

[10 marks.]

5. Prove that the external angle of a triangle is equal to the sum of the opposite internal angles.

Hence or otherwise show that the angle in a semi-circle is a right angle.

[12 marks.]

6. Two pipes, A and B, bring water to a tank and a third pipe C takes away the waste. Pipe A can fill the tank in 2 hours and pipe B in 3 hours, while pipe C can empty a full tank in $1\frac{1}{2}$ hours.

Find how long it will take to fill the tank when (i) A and B are flowing together and C is closed, (ii) A and B are flowing together and C is open, and (iii) A and B flow together for 20 minutes before C is opened.

[12 marks.]

7. Solve the equations:—

(i) $0.2(2x-1) - 0.7(3x+1) + 0.4(4x+3) = 0.$

(ii) $6x - 7y = 20$
 $7x - 6y = 19.$

(iii) $6x^2 + 6 = 13x.$

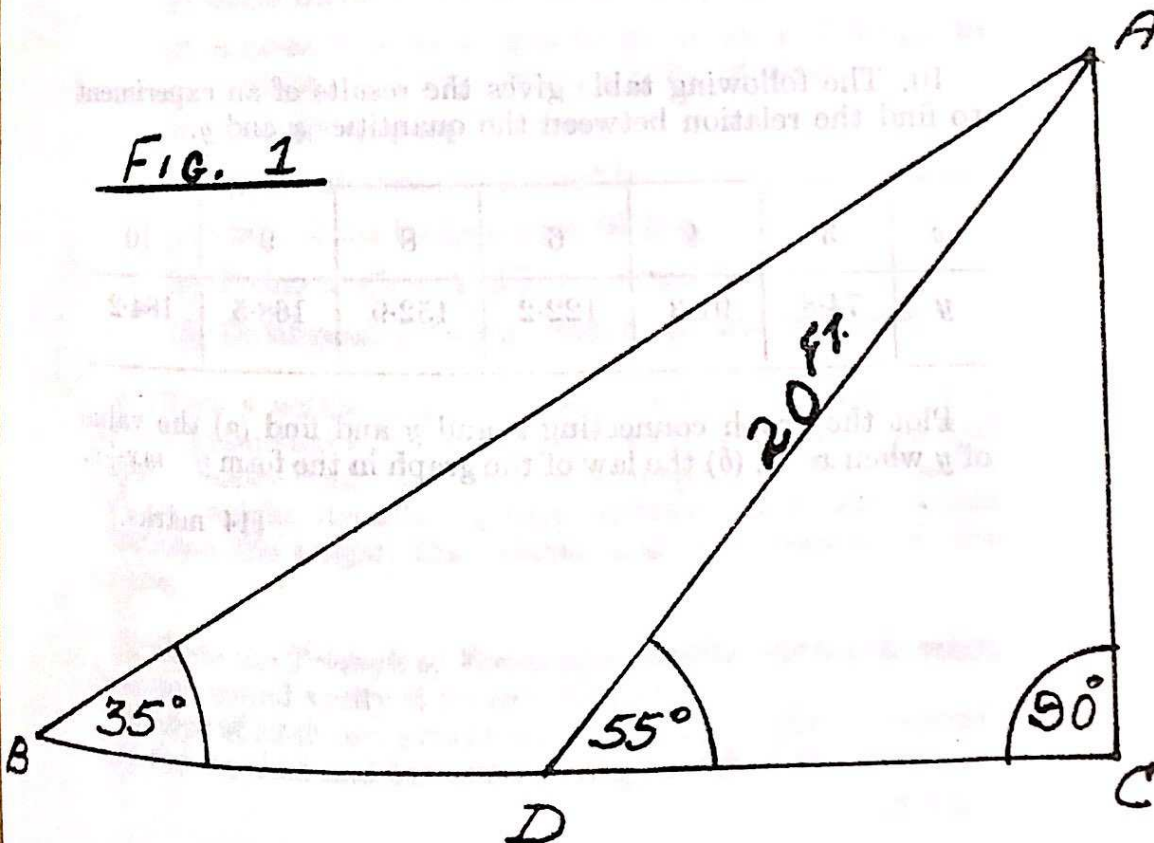
[14 marks.]

8. (a) Construct the angle whose sine is $\frac{1}{2}$ and calculate the value of its cosine and tangent.

(b) From the diagram shown in Fig. 1 determine the lengths of AC, CD and BD.

[14 marks.]

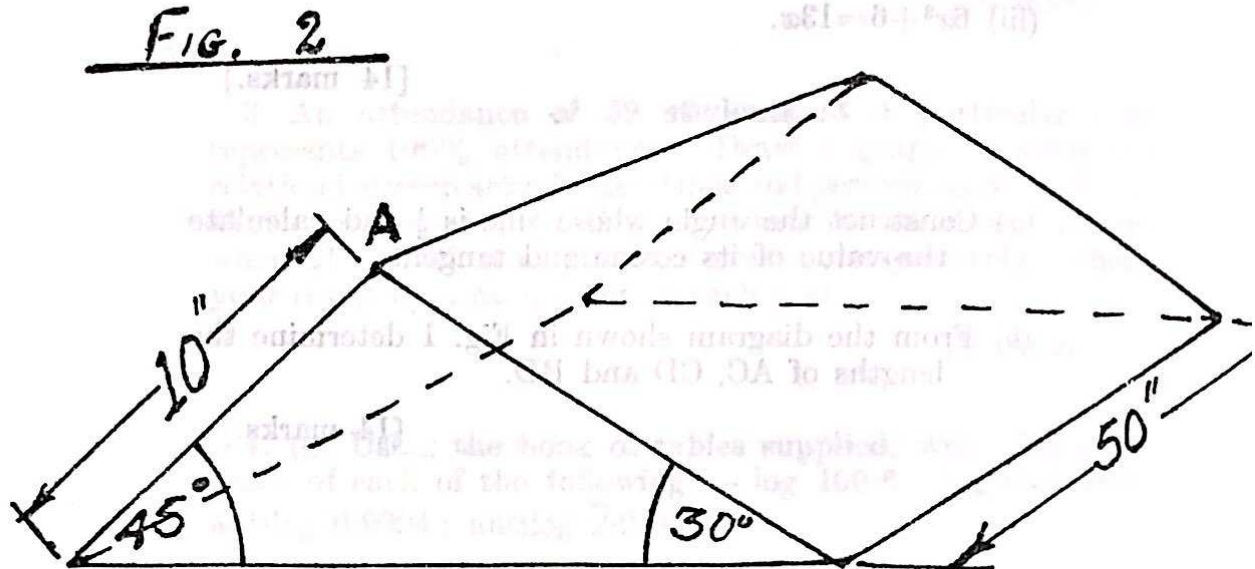
Fig. 1



9. Calculate the weight of the timber prism shown in Fig. 2. The timber weighs 50 lbs. per cubic foot.

(Hint: Drop a perpendicular from the point A to base of triangle.)

[14 marks.]



10. The following table gives the results of an experiment to find the relation between the quantities x and y .

x	3	4	6	8	9	10
y	74.8	91.3	122.2	152.9	168.5	184.2

Plot the graph connecting x and y and find (a) the value of y when $x=7$, (b) the law of the graph in the form $y=mx+c$.

[14 marks.]