AN ROINN OIDEACHAIS.

AN BHRAINSE GHAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS

for

DAY VOCATIONAL COURSES, 1948.

MATHEMATICS.

Monday, June 28th—10 *to* 1 *p.m.*

INSTRUCTIONS.

(*a*) Not more than *eight* questions to be attempted.

(*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.

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1. Find the cost of a metal casting weighing 3 cwt. 2 qr. 12 lb. at £3 13s. 8d. per cwt.

Answer to nearest penny.

[10 Marks.]

2. A circular disc has a circumference of 7·45 inches. Find (*a*) the diameter of the disc, (*b*) the area of one face of the disc, correct to 2 decimal places in each case. (Take $\pi = 3{\cdot}14$).

[10 marks.]

3. (*a*) Find a if $4(2a-3)-6(a+1)=3(a-5)$.

(*b*) In the equation $E=aW+b$, E=52 lbs. when W=120 lbs. and E=80 lbs. when W =260 lb. Find the values of a and b.

[10 marks.]

4. (*a*) Express 5s. 6d. as a percentage of £2 3s. 6d. correct to 2 decimal places.

(*b*) A rectangle is 1 ft. 8 ins. long and 1 ft. 3 ins. broad. Its length is increased by 15 per cent. and its breadth decreased by $6\frac{2}{3}$ per cent. Find the change per cent. in its area.

[10 marks.]

5. A cylindrical oil drum is 15 inches in diameter and 18 inches in height. Find its capacity in gallons if 1 gallon is equal to 277 cubic inches. Answer to nearest tenth of a gallon.

[10 marks.]

6. Rearrange the formula $c = \frac{ax}{x-b}$ so as to obtain an expression for x in terms of a, b and c.

If $a=1{\cdot}2$, $b=19{\cdot}5$ and $c=6{\cdot}5$ find the value of x correct to one decimal place.

[10 marks.]

7. Prove that the sum of the three angles of any triangle is equal to two right angles.

Construct an isosceles triangle having the vertical angle equal to 45° and the base $3\frac{1}{4}$ inches long. Explain briefly your method of construction, marking in the number of degrees in each base angle.

[12 marks.]

8. A box, which measures 3 ft. 9 ins. long, 2 ft. 3 ins. wide, and 1 ft. 9 ins. high externally, is made of wood $1\frac{1}{2}$ ins. thick, and has a lid. Find (*a*) the number of sq. ft. of paper required to cover all its faces internally, (*b*) the weight of wood in the box to nearest lb. if 1 cubic foot of the wood weighs 30 lb.

[12 marks.]

9. (*a*) Write down in their simplest forms the values of each of the following:

$$2\times 2^{-3}\ ;\quad \frac{1}{27^{-\frac{1}{3}}}\ ;\quad 64^{\frac{1}{6}}\ ;\quad (5^2)^{\frac{3}{2}}\ ;\quad 16^{-\frac{3}{2}}.$$

(*b*) Find by logarithms the value of $\sqrt{\frac{\cdot 02821\times 6{\cdot}895}{24{\cdot}37}}$.

[14 marks.]

10. If $y=3x^2+4x-15$ find the values of y for each of the following values of x : -4, -3, -2, -1, 0, 1, 2, 3. Plot the graph showing how y varies with respect to x and so find the values of x which satisfy the equation $3x^2+4x-15=0$. What is the least value y can have ?

[14 marks.]

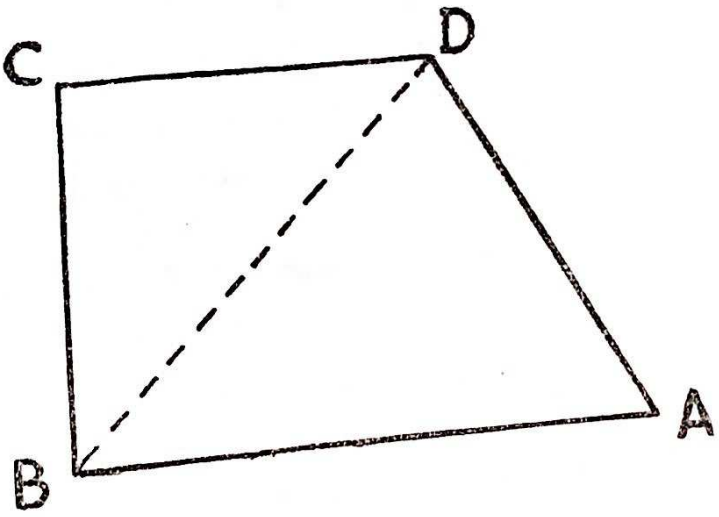
11. Construct a circle of radius 1·5 ins. and draw a tangent to it from a point which is 3·8 ins. from the centre. Show method of drawing the tangent.

If the external point is P, the centre of the circle O and the point of contact of the tangent with the circle is T, calculate (i) the length of PT and (ii) the number of degrees in the angle OPT and check your results by measurements.

[14 marks.]

12. In the figure ABCD, AB=20 ft., BC=13 ft., B=C=90° and A=60°.

Find the length of the diagonal BD by *calculation* (not by a drawing to scale).



[14 marks.]