AN   ROINN   OIDEACHAIS   M.45(a)

INTERMEDIATE   CERTIFICATE   EXAMINATION,   1984

MATHEMATICS – LOWER COURSE – PAPER I (150 marks)

FRIDAY, 8 JUNE – MORNING – 9.45 to 12.15

Examination Number

SECTION A (45 marks)

Attempt all questions. You should not spend more than 45 minutes on this section.
Answer each question by writing one of (a), (b), (c), (d) in the box under each question number.
If you wish to change an answer, cross out your first choice and write your new answer near the box.
Mathematical tables may be obtained from the Superintendent.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1. $(\frac{1}{2} + \frac{1}{4}) \div \frac{3}{4}$

   (a) $\frac{9}{16}$ (b) 0   (c) $\frac{5}{6}$ (d) 1

2. $0 \cdot 0132 \times 10^2 =$

   (a) $0 \cdot 0264$ (b) $2 \cdot 264$ (c) $0 \cdot 132$ (d) $1 \cdot 32$

3. IR£60 less 5% is IR£

   (a) 55   (b) 57   (c) 63   (d) 65

4. The length of a circle is 5π. The length of the radius is

   (a) $2 \cdot 5$ (b) 10   (c) $2 \cdot 5\pi$ (d) 10π

5. $1\frac{3}{4}$ litres of oil cost IR£$2 \cdot 80$. The cost of 1 litre in IR£ is

   (a) $1 \cdot 60$ (b) $4 \cdot 90$ (c) $2 \cdot 10$ (d) $2 \cdot 00$

6. M is the image of N under a

   (a) a central symmetry
   (b) a translation
   (c) an axial symmetry
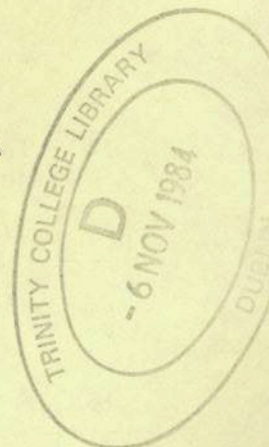   (d) a projection.
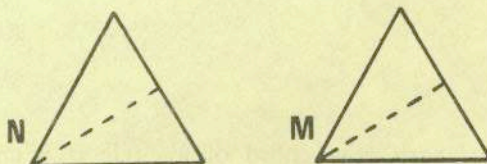
7. If $\vec{pq} = \vec{qs}$, which one of the following is false ?

   (a) s is the image of p under S_q
   (b) q is its own image under the axial symmetry in ps
   (c) $(p, q) \uparrow (s, q)$
   (d) $2|pq| = |ps|$

8. If $A \parallel B$, then $x =$

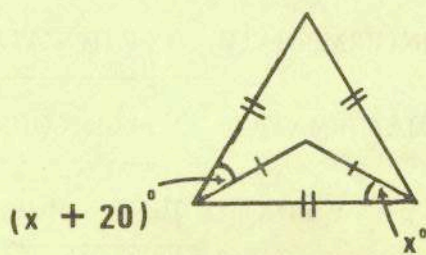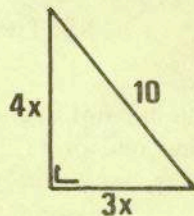   (a) 30   (b) 60
   (c) 90   (d) 120
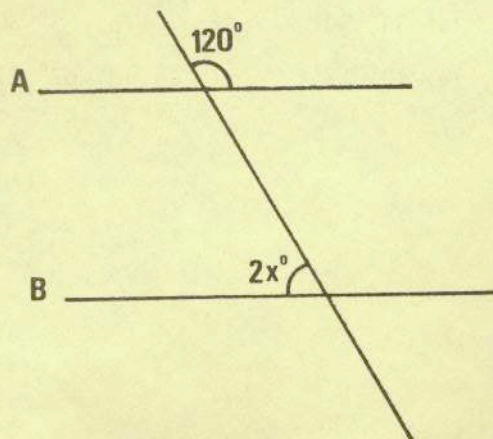
OVER →

9. The value of x is

   (a) 10
   (b) 20
   (c) 30
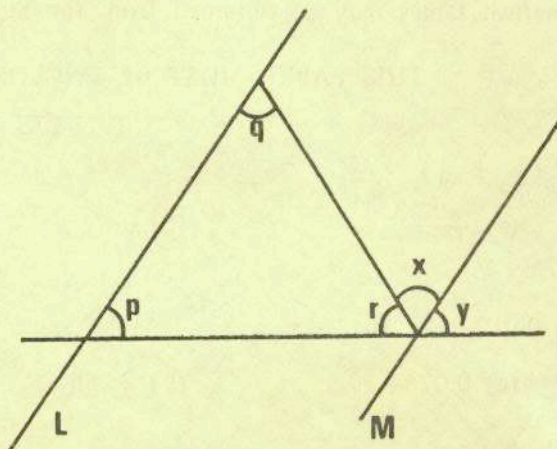   (d) 40

10. $x^2 =$

    (a) 2
    (b) $\frac{\sqrt{10}}{5}$
    (c) $\frac{10}{25}$
    (d) 4

11. $L \parallel M$ and p, q, r, x, y are the measures in degrees of the angles. Which one of the following is false ?

    (a) $p + r + x = 180°$
    (b) $y = p$
    (c) $p + q = x$
    (d) $q + r = 180° - y$
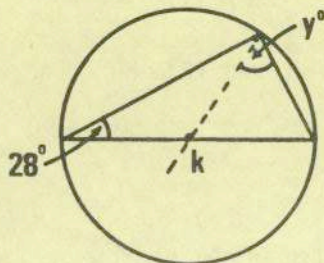
12. Tan $(50·5)°$ is

    (a) 0·2131
    (b) 1·2275
    (c) 0·2275
    (d) 1·2131

13. k is the centre of the circle; $y =$
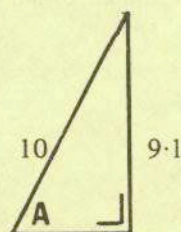
    (a) 28
    (b) 34
    (c) 62
    (d) 90

14. The length of a chord of a circle is 8 cm. The centre of the circle is 3 cm from the chord. The length of the radius in cm is

    (a) 5
    (b) $\sqrt{73}$
    (c) 7
    (d) 11

15. **A** measures

    (a) 34° 30′
    (b) 65° 30′
    (c) 42° 18′
    (d) 62° 22′

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SECTION B (105 marks)

Attempt **QUESTION 1** (30 marks) and **THREE** other questions (25 marks each)

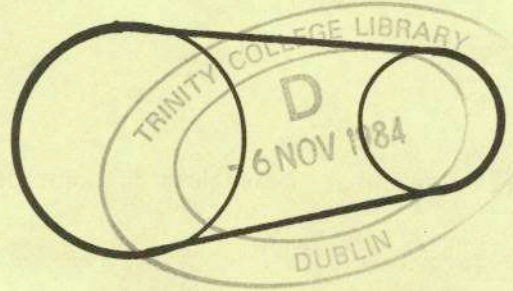**Marks may be lost if all your work is not clearly shown**

1. (a) Calculate the value of

$$\frac{10\,(7 \cdot 168 \; + \; 2 \cdot 832)}{8\,(8 \cdot 762 \; - \; 5 \cdot 637)}$$

(b) Using Tables (P.20 – P.27), or otherwise, find the value, correct to four decimal places, of

$$\frac{(7 \cdot 874)^2 \; + \; \sqrt{787 \cdot 4}}{78 \cdot 74}$$

(c) A belt is tight about two wheels of radius 10 cm and 2 cm, respectively. How many times does the small wheel turn for each turn of the large wheel ?

2. Express, in terms of π, the volume of a cylinder of diameter length 14 cm and height 20 cm.

Oil flows into a rectangular tank through a cylindrical hose of diameter length 14 cm at the rate of 20 cm per second.
The tank measures 88 cm by 120 cm by 210 cm.

Calculate the time in seconds to fill the tank, if the tank was empty at the start, taking π to be $\frac{22}{7}$.

3. *abcd* and *xycd* are two parallelograms with z the mid-point of $[ac]$. Name

(i) two couples equipollent to (x, y)

(ii) a translation which maps the $\triangle axd$ onto the $\triangle byc$

(iii) the image of the $\triangle azd$ under the central symmetry in z

(iv) the image of $\triangle abz$ under the projection on ac parallel to bd.
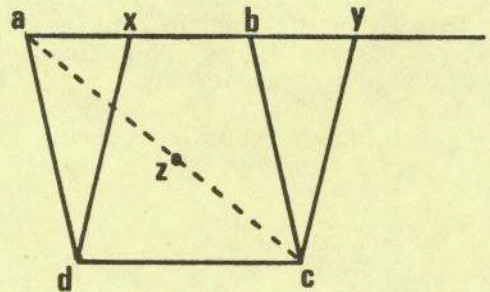
If the area of *abcd* is 10 and the area of $\triangle axd$ is 2, write down the area of $\triangle ayc$.

OVER →

4. Prove that the measures of the three angles of a triangle sum to 180°.   Hence, prove that the measures of the angles of any quadrilateral sum to 360°.

    Calculate the value of x and the value of y as shown in the diagram.
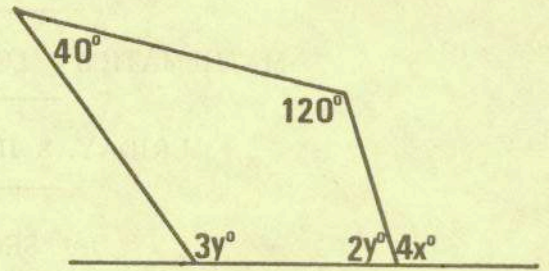
5. Draw a circle of radius 6·5 cm.

    Inscribe a triangle abc in the circle, such that,

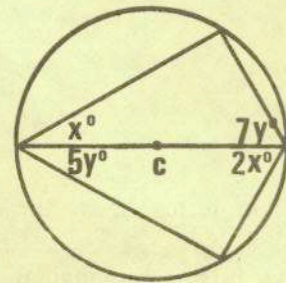$$|ac| = 5 \text{ cm}, \quad |ab| = 12 \text{ cm}, \quad |bc| = 13 \text{ cm}.$$

    Complete the quadrilateral $abkc$ such that $|bk| = 10$ cm and $|\angle bkc| = 90°$.

    Write down the length of $[kc]$ and find the value of

$$|bc|^2 - |kc|^2.$$

6. Prove that the angle at a point of a circle standing on a diameter is a right angle.

    If c is the centre of the circle, calculate the value of x and the value of y.

7. (a) Using a protractor draw an angle of 55°.
       Find, without using the Tables, the value of sin 55°.

   (b) Using the diagram find, as accurately
       as the Tables allow, the measure
       of A where $|xp| = 4$, $|pq| = 2·2$.

       If $|xy| = 6·8$, calculate $|yt|$.