

INTERMEDIATE CERTIFICATE EXAMINATION, 1987

MATHEMATICS – LOWER COURSE – PAPER I (150 marks)

THURSDAY, 11 JUNE – MORNING, 9.30 to 12.00

SECTION A (45 marks)

Examination Number

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. $\frac{2}{3} \times (\frac{1}{2} + \frac{1}{6}) =$

- (a) 1 (b) $\frac{4}{9}$ (c) $\frac{4}{3}$ (d) $\frac{7}{18}$

2. An item is reduced from IR£250 to IR£200. The % reduction is

- (a) 5 (b) 20 (c) 25 (d) 50

3. The area of a square is $6\frac{1}{4}$ cm². The length of one side, in cm, is

- (a) $\frac{625}{16}$ (b) $\frac{25}{8}$ (c) $\frac{5}{2}$ (d) $\frac{25}{16}$

4. $0.02345 = 2.345 \times 10^n$, where $n =$

- (a) -3 (b) -2 (c) 2 (d) 3

5. If 100 g of grass-seed covers 3 m², how many kg of grass-seed would be needed to cover 36 m²?

- (a) 10.8 (b) 3.6 (c) 3.0 (d) 1.2

6. Q is the image of P under

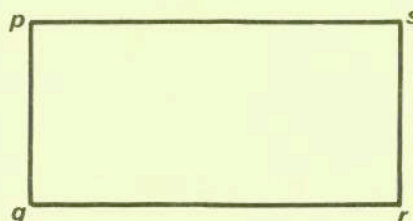
- (a) an axial symmetry (b) a central symmetry
(c) a translation (d) a projection



7. $pqrs$ is a rectangle.

Which one of the following is true?

- (a) $(p,s) \uparrow (s,r)$ (b) $(q,r) \uparrow (r,s)$
(c) $(s,r) \uparrow (q,p)$ (d) $(p,q) \uparrow (s,r)$

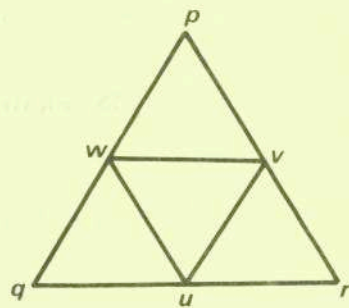


8. The image of the point (1,3) under the central symmetry in the point (3,1) is the point

- (a) (2, 2) (b) (5, -1) (c) (2, -2) (d) (-1, 5)

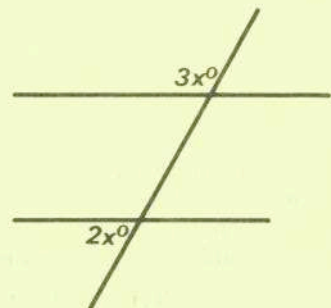
9. u, v, w are the midpoints of the sides of the $\triangle pqr$.
The translation \vec{pw} maps the $\triangle pwv$ onto the

- (a) $\triangle pwv$ (b) $\triangle wqu$
(c) $\triangle wuv$ (d) $\triangle vur$



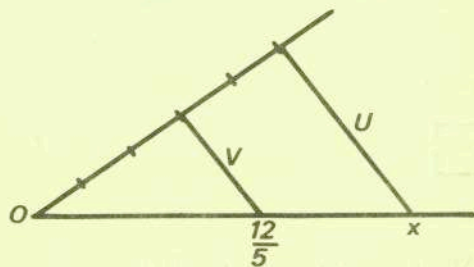
10. If $L \parallel M$, then x° is

- (a) 36° (b) 72°
(c) 108° (d) 180°



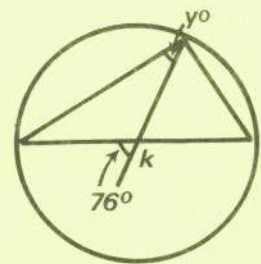
11. If $U \parallel V$, then x is

- (a) $\frac{36}{5}$ (b) 4
(c) 3 (d) $\frac{36}{25}$



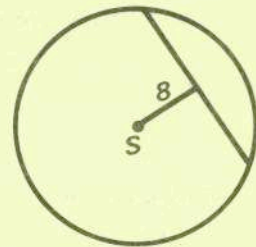
12. k is the centre of the circle.
The value of y is

- (a) 90 (b) 76
(c) 52 (d) 38



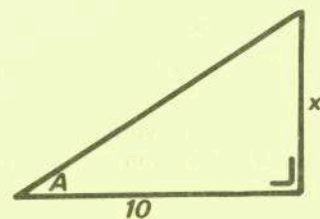
13. The centre s of a circle is 8 mm from a chord of the circle. The length of the diameter is 20 mm.
The length of the chord, in mm, is

- (a) 6 (b) 12
(c) 16 (d) 36



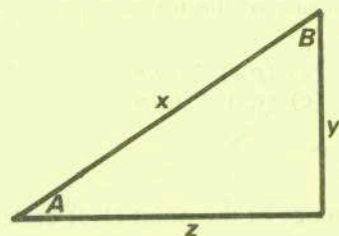
14. If $A = 31^\circ 48'$, then x is

- (a) .515 (b) .527
(c) 5.15 (d) 15.27



15. Which of the following is false?

- (a) $\tan B = \frac{z}{y}$ (b) $\sin A = \frac{y}{x}$
(c) $\cos B = \frac{x}{y}$ (d) $\tan A = \frac{y}{z}$



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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 $6(0.0568) + 6(0.1942) - 6(0.201)$.

(b) Using your tables (p.20–p.27), or otherwise, find the value, correct to two significant figures, of

$$\left\{ (4.505)^2 + \sqrt{246.5} \right\} \div \frac{1}{1.2}$$

 (c) A girl cycles $\frac{1}{6}$ th of her journey to school, travels by bus for $\frac{4}{5}$ ths of the journey and walks the remainder which is 360 m.

What fraction of her journey to school does she walk?

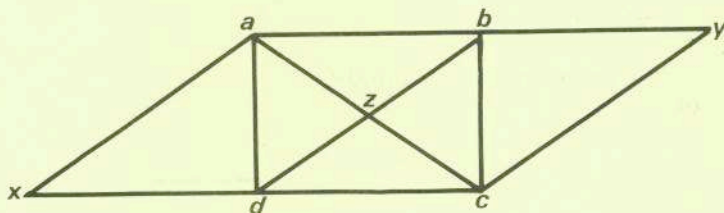
What is the overall length of her journey to school?

2. Calculate the volume of a cylindrical tank of height 1.75 m and which has a diameter of 1.2 m.

 Take π to be $\frac{22}{7}$.

Find the cost of filling the tank with oil if 100 litres of oil cost IR£15.

If the cost of 100 litres of oil falls by 20%, how much money is now saved in filling the tank with oil?

 3. $abcd$ is a rectangle. $abdx$ and $bycd$ are parallelograms

 (i) Name three couples equipollent to (d,c) .

 (ii) What is the image of $\triangle bcy$ under the central symmetry in z ?

 (iii) What is the image of $\triangle axd$ under the axial symmetry in the line ad ?

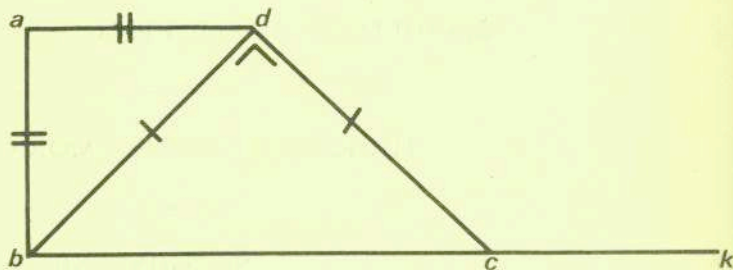
 (iv) If the area of $\triangle adz = 5$, what is the area of the figure $xayc$?

4. Prove that the measure of the exterior angle of a triangle equals the sum of the measures of the two interior opposite angles.

In the quadrilateral $abcd$,
 $ab \perp bc$.

Prove that

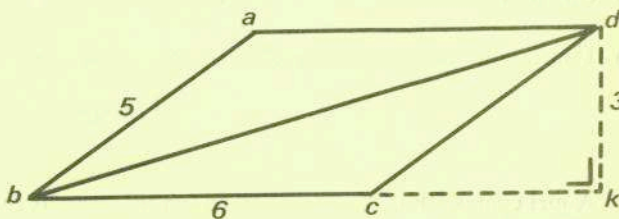
$$|\angle dck| = |\angle adc|$$



5. Prove that the diagonal of a parallelogram bisects the area of the parallelogram.

Write down the area of

- (i) the $\triangle abd$
 (ii) the quadrilateral $abkd$.

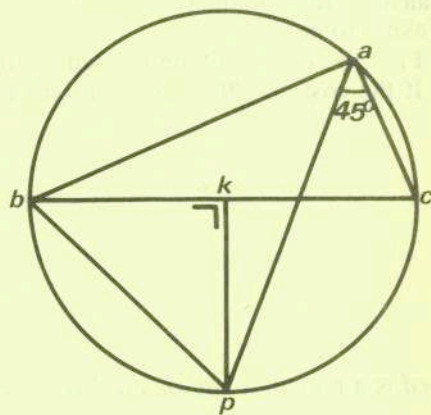


6. Prove that the angle at a point of a circle standing on a diameter is a right angle.

k is the centre of the circle. $kp \perp bc$ and
 $|ab| = |ap|$.
 abp is an isosceles triangle.
 Name the other isosceles triangle.

If $|\angle pac| = 45^\circ$, prove that

$$|\angle abc| = 22\frac{1}{2}^\circ$$



7. (a) If $Q < 90^\circ$ and $\sin Q = 0.5250$, use your tables to find Q .
 Hence find the value of $\sin 2Q$.

- (b) The diagram shows a children's slide xyz where
 $|\angle yzq| = 15^\circ 40'$ and $|\angle xyt| = 35^\circ 54'$.

Verify that $|zq| = 9.629$ and find the length of the slide correct to the nearest metre.

