

INTERMEDIATE CERTIFICATE EXAMINATION, 1982

MATHEMATICS - LOWER COURSE - PAPER I (150 marks)

FRIDAY, 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.

Mathematics tables may be obtained from the Superintendent.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1. $2\frac{3}{8} - 1\frac{1}{4} =$

(a) $1\frac{1}{2}$ (b) $\frac{7}{8}$ (c) $\frac{5}{8}$ (d) $1\frac{1}{8}$

2. $17.125 \times 20 =$

(a) 34.25

(b) 171.25

(c) 342.50

(d) 34.50

3. IR£10 + 15% VAT in IR£ is

(a) 11.50

(b) 10.15

(c) 15.15

(d) 15.00

4. The area of a disc is 9π . The length of its radius is

(a) 9

(b) 6π

(c) 3

(d) 4.5π

5. A car uses 3 litres of petrol for every 36 km travelled. On a journey of 216 km, the number of litres used is

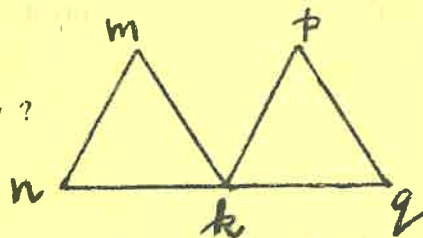
(a) 12

(b) 18

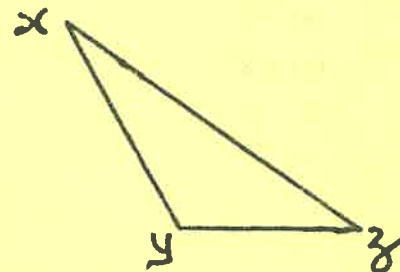
(c) 2

(d) 4

6. Which one of the following translations does not map the equilateral Δmnk onto the equilateral Δpkq ?

(a) \vec{nq} (b) \vec{nk} (c) \vec{mp} (d) \vec{kq} 

7. The image of $[xy]$ under the projection on yz parallel to xz is

(a) $[xz]$ (b) $[yz]$ (c) the point y (d) the point z 

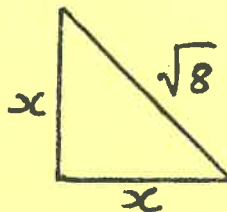
8. $x^2 =$

(a) 4

(b) 8

(c) 32

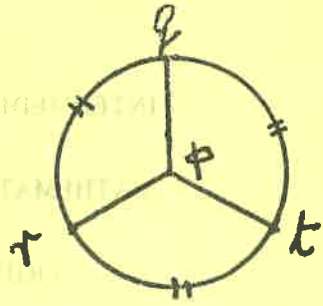
(d) 64



OVER →

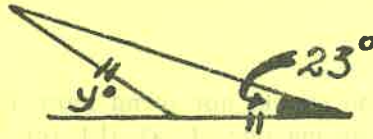
9. p is the centre of the circle. $[pr]$ is the image of $[pq]$ under the anti-clockwise rotation about p of angle

- (a) 60°
- (b) 120°
- (c) 180°
- (d) 360°

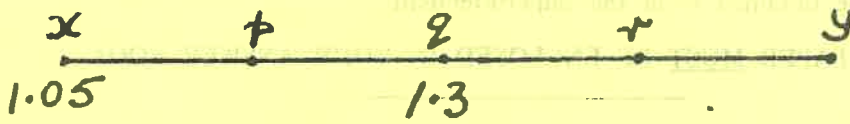


10. $y =$

- (a) 134
- (b) 46
- (c) 23
- (d) 44



11.



$[xy]$ is divided into four equal parts. The number 1.425 is represented by

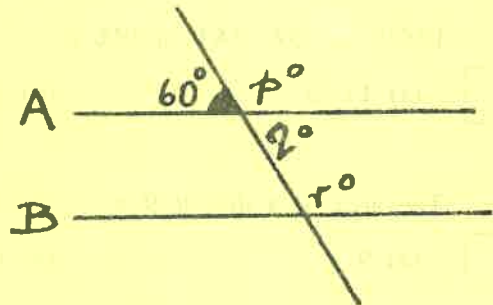
- (a) p
- (b) r
- (c) y
- (d) no one of these

12. $\tan 47^\circ 32'$ is

- (a) 1.0926
- (b) 0.0926
- (c) 0.0900
- (d) 0.7377

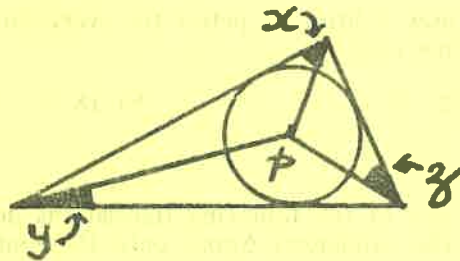
13. $A \parallel B$. Which one of the following is false ?

- (a) $r = 120$
- (b) $r = p$
- (c) $r + q = 180$
- (d) $p + q + r = 240$



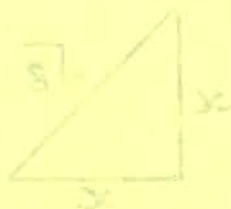
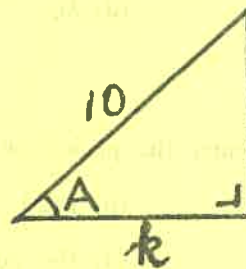
14. p is the centre of the incircle. $x + y + z =$

- (a) 360°
- (b) 180°
- (c) 90°
- (d) 45°



15. If $A = 43^\circ 7'$, then k is

- (a) 7.3
- (b) 7.304
- (c) 6.835
- (d) 9.364



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MATHEMATICS – LOWER COURSE – PAPER I (150 marks)

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SECTION B (105 marks)

Attempt QUESTION 1 and THREE other questions

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

1. (a) Calculate, to one place of decimals, the value of

$$\frac{30 \times 11 + 30 \times 8 + 11 \times 8}{22 \times 4 \times 4}$$

- (b) Using your tables, page 20 to 27, or otherwise, find

(i) $(4.546)^2$

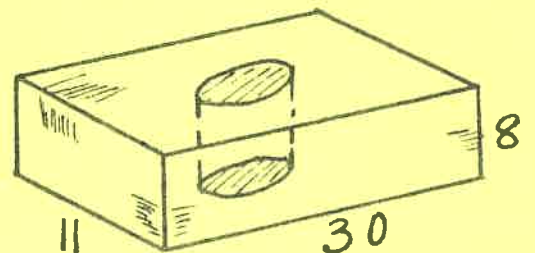
(ii) $\frac{1}{4.546}$

(iii) $\sqrt{\frac{100}{(4.546)^2}}$

(25 marks)

2. A metal block of height 8 cm has a base measuring 30 cm by 11 cm. Calculate its volume.

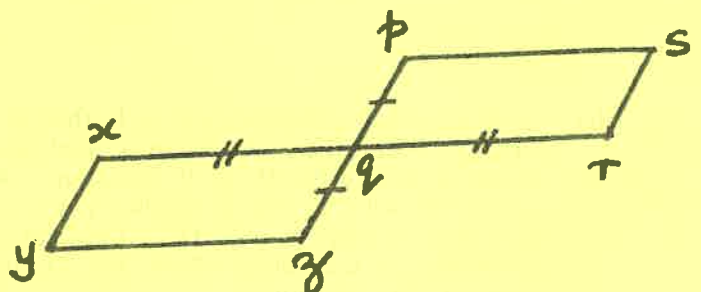
A solid cylinder is cut out of the block from top to bottom, as in diagram. This reduces the volume of the block by 10%. Find to the nearest cm the radius of the cylinder.

(Take $\pi = \frac{22}{7}$).

(20 marks)

- 3.
- $pqrs$
- and
- $qxyz$
- are two parallelograms.

- Name three couples equipollent to (s,r) .
- What is the image of the Δxyq under the central symmetry in q ?
- Name the translation that maps $qxyz \rightarrow pqrs$.
- Let K be the bisector of $\angle zqr$. Construct the image of $[yz]$ under the axial symmetry in K .



(20 marks)

4. Using $[ab]$ as base, construct the quadrilateral $abcd$ given that

$$|ab| = 8 \text{ cm}, |\angle abc| = 90^\circ.$$

$$|bc| = 6 \text{ cm}, |\angle bad| = 70^\circ, |ad| = 4 \text{ cm}.$$

Draw the perpendicular $[dx]$ from d to ac and measure its length.

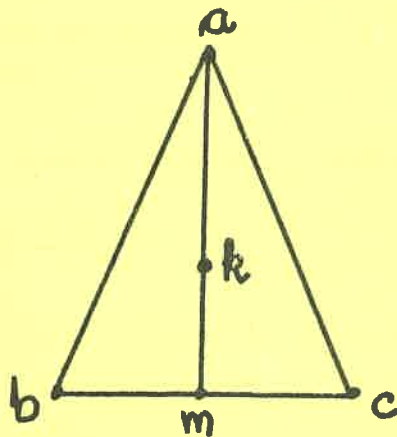
Calculate the area of the $\triangle dac$ and the area of the quadrilateral $abcd$.

(25 marks)

5. If two sides of a triangle are equal in length, prove that the angles opposite these sides are equal in measure.

abc is an isosceles triangle having $|ab| = |ac|$. k is any point on the bisector, am , of the $\angle bac$. Say, giving reasons, why

km bisects the $\angle bkc$.



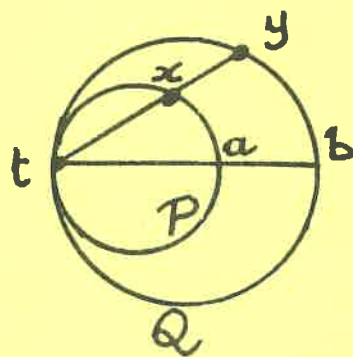
(25 marks)

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

P and Q are two circles touching at t and having $[ta]$ and $[tb]$ as diameters. y is any point of Q and ty cuts P at x .

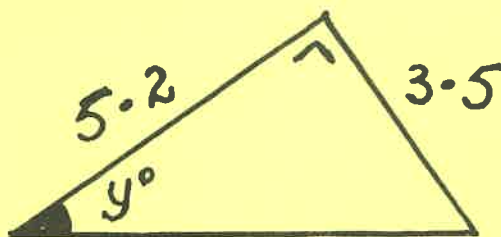
Prove

$$xa \parallel yb.$$

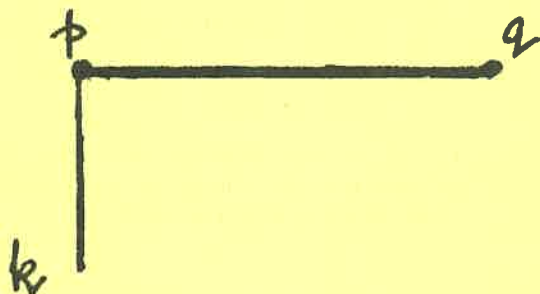


(25 marks)

7. (a) Calculate y as accurately as the tables allow.



(b) p and q are two lighthouses such that p is directly West of q . At noon a boat leaves p and sails due South at 9 km/hour. After sailing for 40 minutes it reaches a point k such that $|\angle pkq| = 63^\circ 31'$. Find, as accurately as the tables allow, the distance between the lighthouses.



(30 marks)