AN ROINN OIDEACHAIS

LEAVING CERTIFICATE

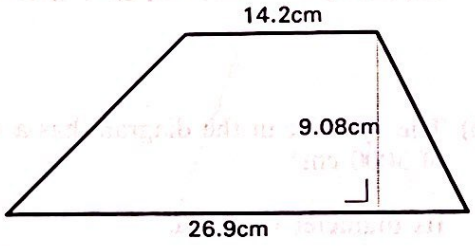
MATHEMATICS — FOUNDATION LEVEL

SAMPLE PAPER 1995

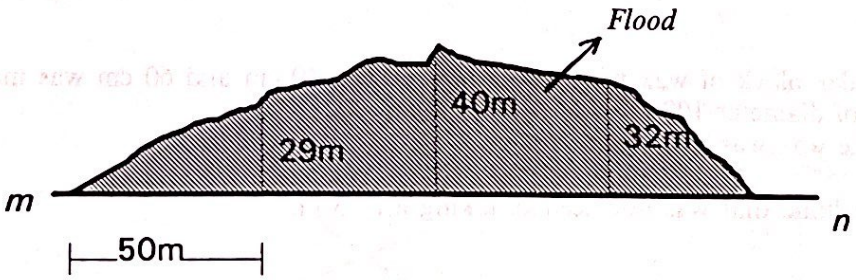
PAPER 2 (300 marks) — $2\frac{1}{2}$ hours

Attempt **SIX QUESTIONS** (50 marks each).
Marks may be lost if necessary work is not clearly shown.

1. **(a)** Calculate, correct to one place of decimals, the area of the trapezium using the measurements in the diagram.



(b) Owing to heavy storms a river overflows and floods a motorway.

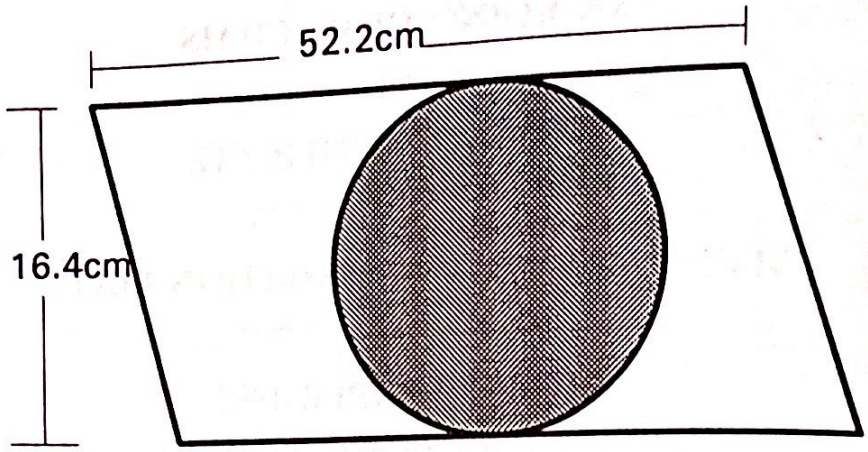


The flooded part of the motorway is measured from the line *mn* using offsets at intervals of 50m.

Using Simpson's Rule, estimate the area of the motorway which has been flooded.

1. (contd.)

(c) The diagram shows a disc inside a parallelogram.



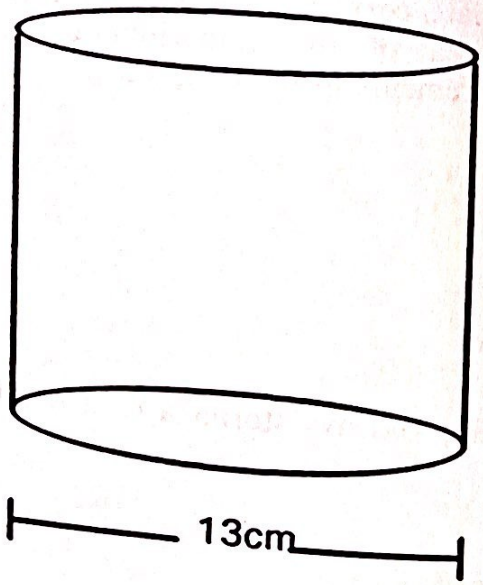
Calculate to 1 place of decimals the area which is not shaded.
Take $\pi = 3.14$.

2. **(a)** A solid sphere has a diameter of 28 cm.
Calculate its volume in cm^3. Give your answer correct to one place of decimals. Take $\pi = 3.14$.

(b) The cylinder in the diagram has a volume of 3000 cm^3.

Its diameter is 13 cm.

Calculate the height of the cylinder, correct to two places of decimals.
Take $\pi = 3.14$.

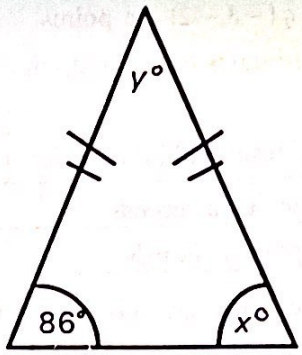


(c) A rectangular block of wax with dimensions 40 cm, 40 cm and 60 cm was melted and reshaped as a cone of diameter 100 cm and height 36 cm.
Some of the wax was not needed.

Find the volume that was not needed, taking π as 3.14.

3. **(a)** The diagram shows an isosceles triangle.

Find the value of x and the value of y.



(b) $pqrs$ is a parallelogram.

$|\ ps\ | = 8$ cm,
$|\ sr\ | = 6$cm
and $|\ \angle psr\ | = 80°$.

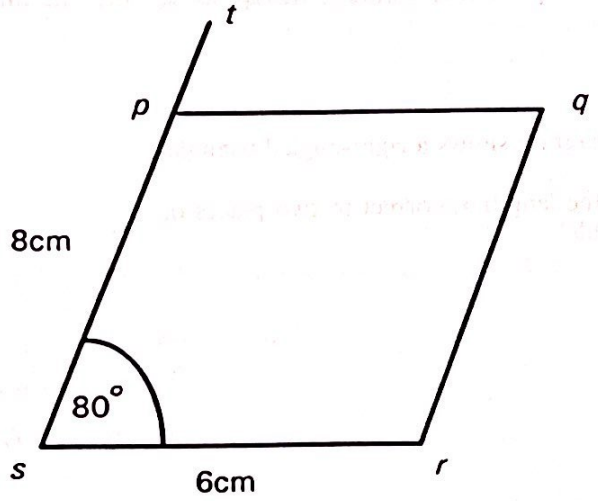
Find the value of

(*i*) $|\ qr\ |$

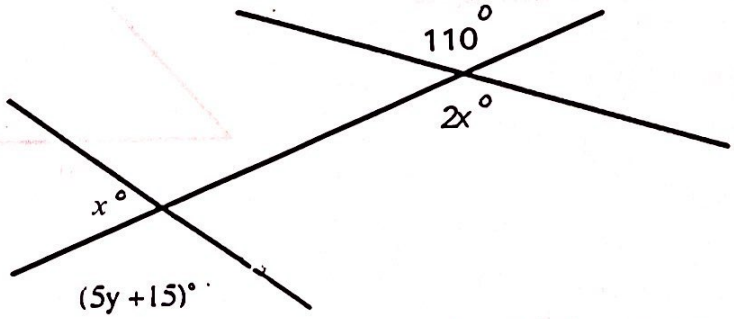
(*ii*) $|\ pq\ |$

(*iii*) $|\ \angle pqr\ |$

(*iv*) $|\ \angle tpq\ |$.



(c) Find the value of x and the value of y.



4. (a) $p(-4,6)$ and $q(-3,-2)$ are points.
Find the coordinates of the midpoint of $[pq]$.

(b) The following results of an experiment were noted:

Time, x, in seconds	1	2	3	4	5
Speed, y, in m/s	51	58	65	74	84

(*i*) Plot these points (x, y) on graph paper.

(*ii*) Join the points (2,58) and (4,74) by a line.

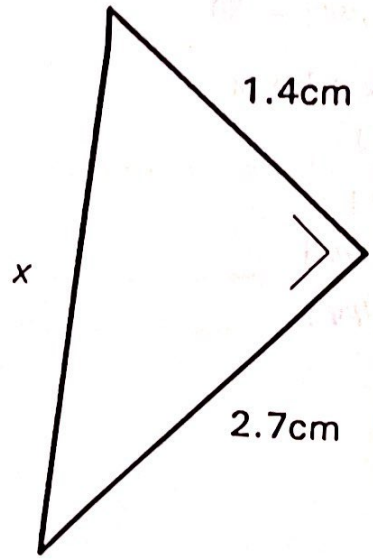
(*iii*) Find the slope of the line.

(*iv*) Write down the equation of the line.

Use the equation to estimate the speed, y, when the time, x, is 12 seconds.

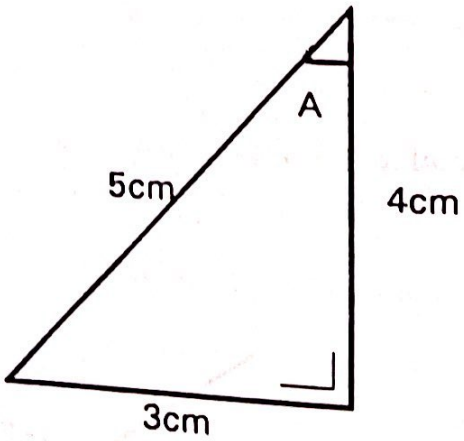
5. (a) The diagram shows a right-angled triangle.

Find the length x, correct to two places of decimals.



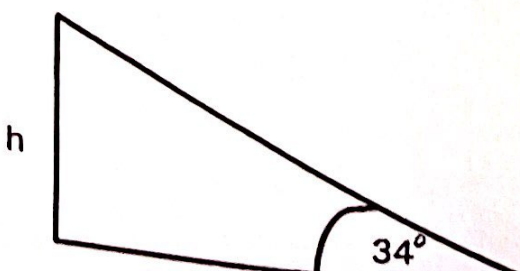
(b) Find sin A.
Write the answer as a decimal.

Hence find the measure of the angle A, correct to the nearest degree.



(c) The top of a building has an angle of elevation of 34° at a distance of 30 m.

Find the height h of the building, correct to two places of decimals.



6. **(a)** A factory makes shirts as follows:

Material	silk	cotton	denim	
Size	small	medium	large	extra large
Sleeve	long	short		

Calculate how many different types of shirt the factory makes.

(b) A soft drinks company surveyed 1000 young people in the age group 8–18 years old and asked each for an opinion about the company's soft drink. The responses are shown in the table below.

Opinion	"Like it very much"	"Like it a bit"	"Don't like it"	"No opinion"
Under 16 years old	181	389	107	60
16 years or older	38	149	32	44

If a young person in the age group 8–18 years old is picked at random, what is the probability that he/she

(*i*) is 16 years old or older and does not like the soft drink?

(*ii*) has no opinion about the soft drink?

(*iii*) has a favourable opinion about the soft drink?

(c) A bag contains 3 red balls, 3 blue balls and 2 white balls.
A fair coin is tossed and a ball is taken at random from the bag.

What is the probability of getting

(*i*) a Head **and** a red ball

(*ii*) a Head **or** a red ball?

7. **(a)** The ages of a group of seven school students are

18, 15, 16, 16, 17, 14, 16.

(*i*) Find the mean age of the group.

(*ii*) Calculate the standard deviation of the mean, correct to 1 place of decimals.

(b) 100 customers in a department store were surveyed one day and the results are shown in the table:

Money spent (IR£)	0–10	10–20	20–30	30–40	40–50	50–60
No. of customers	18	38	28	10	4	2

[Note: 10–20 means IR£10 or more, but less than IR£20.]

Complete the following cumulative frequency table:

Money spent (IR£)	<10	<20	<30	<40	<50	<60
Cumulative frequency						

Draw the cumulative frequency curve.

Use this curve to estimate

(*i*) the number of customers who spent IR£25 or more and IR£55 or less.

(*ii*) the median amount of money spent in the department store.

8. **(a)** Construct a parallelogram *abcd* with

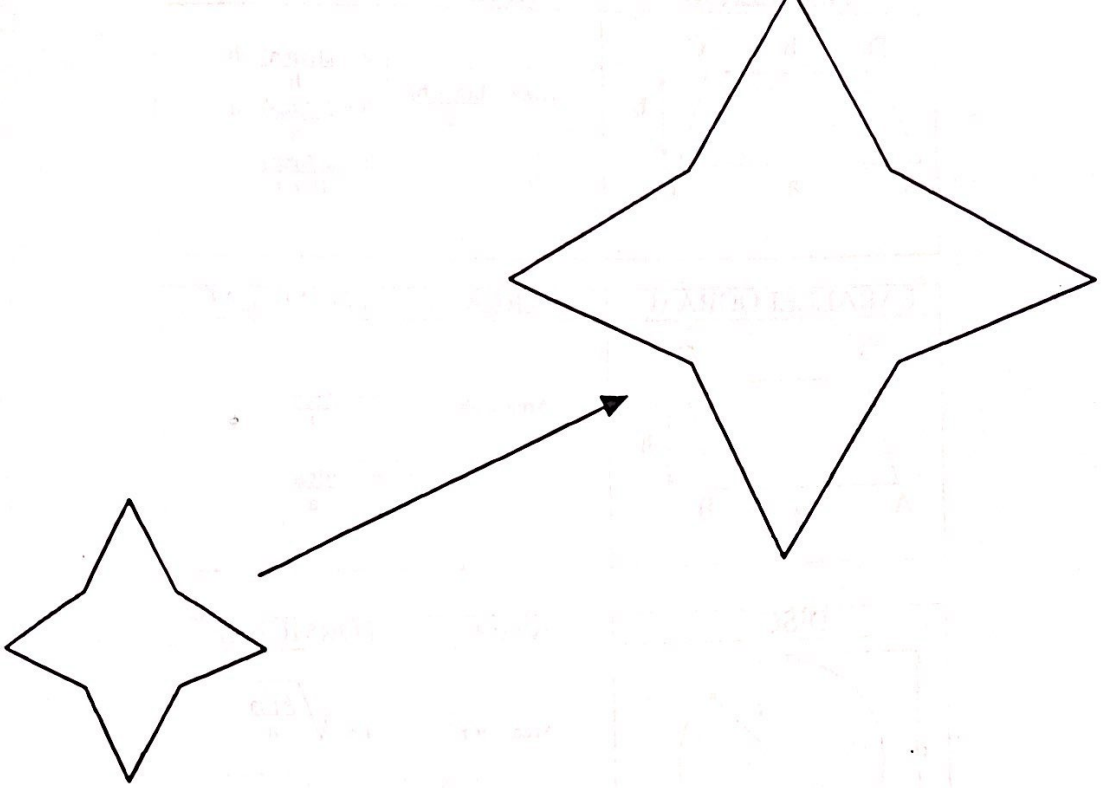
$|\, ab \,| = 6$ cm, $|\, bc \,| = 3$ cm and $|\, \angle abc \,| = 60°$.

(b) Construct a rectangle *pqrs* with $|\, pq \,| = 5$ cm and $|\, qr \,| = 4$ cm.

Construct the image of the rectangle under the enlargement centre *p*, of scale factor $k = 2.5$.

Calculate the area enclosed by the image.

8. (contd.)
(c)



The large star is the image of the small star under an enlargement of scale factor $k = 3.1$. If the area of the large star is 240.25 cm^2, find the area of the small star.

FORMULAE

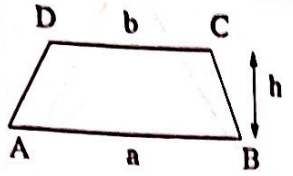
Mid point formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

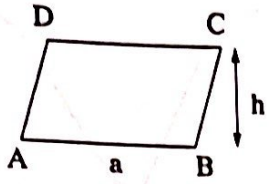
Simpson's Rule: Approximate Area $= \frac{h}{3}$ (First + Last + T.O.F.E.)

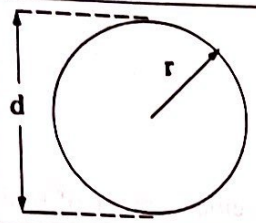
where First = First ordinate; Last = Last ordinate

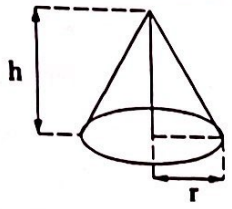
T.O.F.E. = Twice the sum of the Odd ordinates + Four times the sum of the Even ordinates.

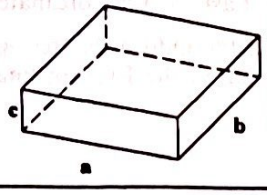
h = the interval

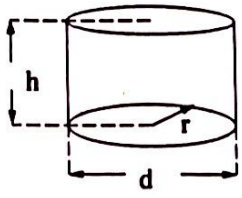
TRAPEZIUM	AREA	FORMULAE
	$\text{Area} = \frac{h(a+b)}{2}$	$a = \frac{2(\text{Area})}{h} - b$ $b = \frac{2(\text{Area})}{h} - a$ $h = \frac{2(\text{Area})}{(a+b)}$

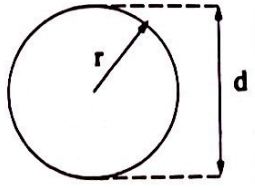
PARALLELOGRAM	AREA	FORMULAE
	$\text{Area} = ah$	$a = \frac{\text{Area}}{h}$ $h = \frac{\text{Area}}{a}$

DISC	AREA	FORMULAE
	$\text{Area} = \pi r^2$ $\text{Area} = \frac{\pi d^2}{4}$	$r = \sqrt{\frac{\text{Area}}{\pi}}$ $d = \sqrt{\frac{4(\text{Area})}{\pi}}$

RIGHT CONE	VOLUME (V)	FORMULAE
	$V = \frac{\pi r^2 h}{3}$	$r = \sqrt{\frac{3V}{\pi h}}$ $h = \frac{3V}{\pi r^2}$

RECTANGULAR BLOCK	VOLUME (V)	FORMULAE
	$V = abc$	$a = \frac{V}{bc}$ $b = \frac{V}{ac}$ $c = \frac{V}{ab}$

CYLINDER	VOLUME (V)	FORMULAE
	$V = \pi r^2 h$ $V = \frac{\pi h d^2}{4}$	$h = \frac{V}{\pi r^2}$ $h = \frac{4V_2}{\pi d}$ $r = \sqrt{\frac{V}{\pi h}}$ $d = \sqrt{\frac{4V}{\pi h}}$

SPHERE	VOLUME (V)	FORMULAE
	$V = \frac{4\pi r^3}{3}$ $V = \frac{\pi d^3}{6}$	Cube roots required