

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

17649

LEAVING CERTIFICATE EXAMINATION, 1998

MATHEMATICS — FOUNDATION LEVEL

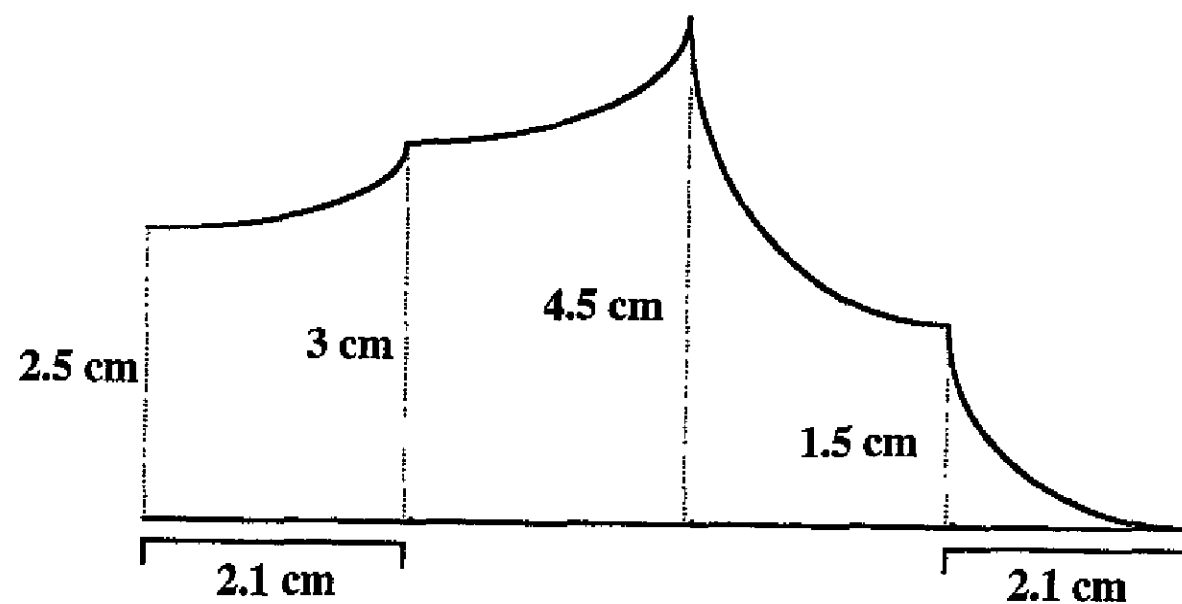
PAPER 2 (300 marks)

FRIDAY, 12 JUNE — MORNING, 9.30 to 12.00

Attempt SIX QUESTIONS (50 marks each).

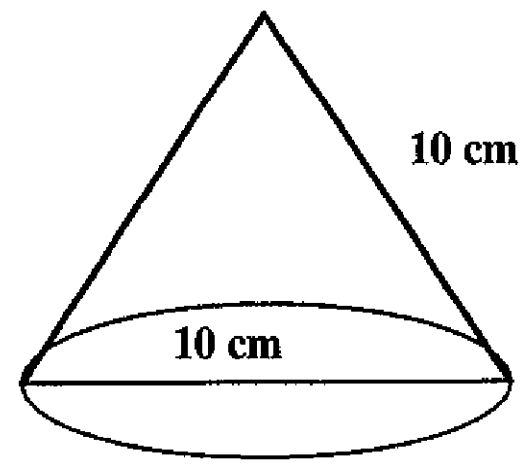
Marks may be lost if necessary work is not clearly shown.
A sheet of formulae will be given to you by the Superintendent.

1. (a) The lengths of the four sides of a rectangle add up to 53 cm. One of the sides measures 9 cm.
Find the area of the rectangle.
- (b) A flat piece of plastic, produced by a factory, is shown (not to scale) in the diagram.
- (i) Calculate its area using the measurements shown, taking the intervals of 2.1 cm along the base line to be equal. (Use Simpson's Rule).



- (ii) Find in cm^2 , the area of the smallest rectangular sheet of plastic from which this piece can be cut.

2. (a) The slant height of a right circular cone is 10 cm. The length of the diameter of the base is 10 cm. Calculate the curved surface area, if π is taken as 3.14.

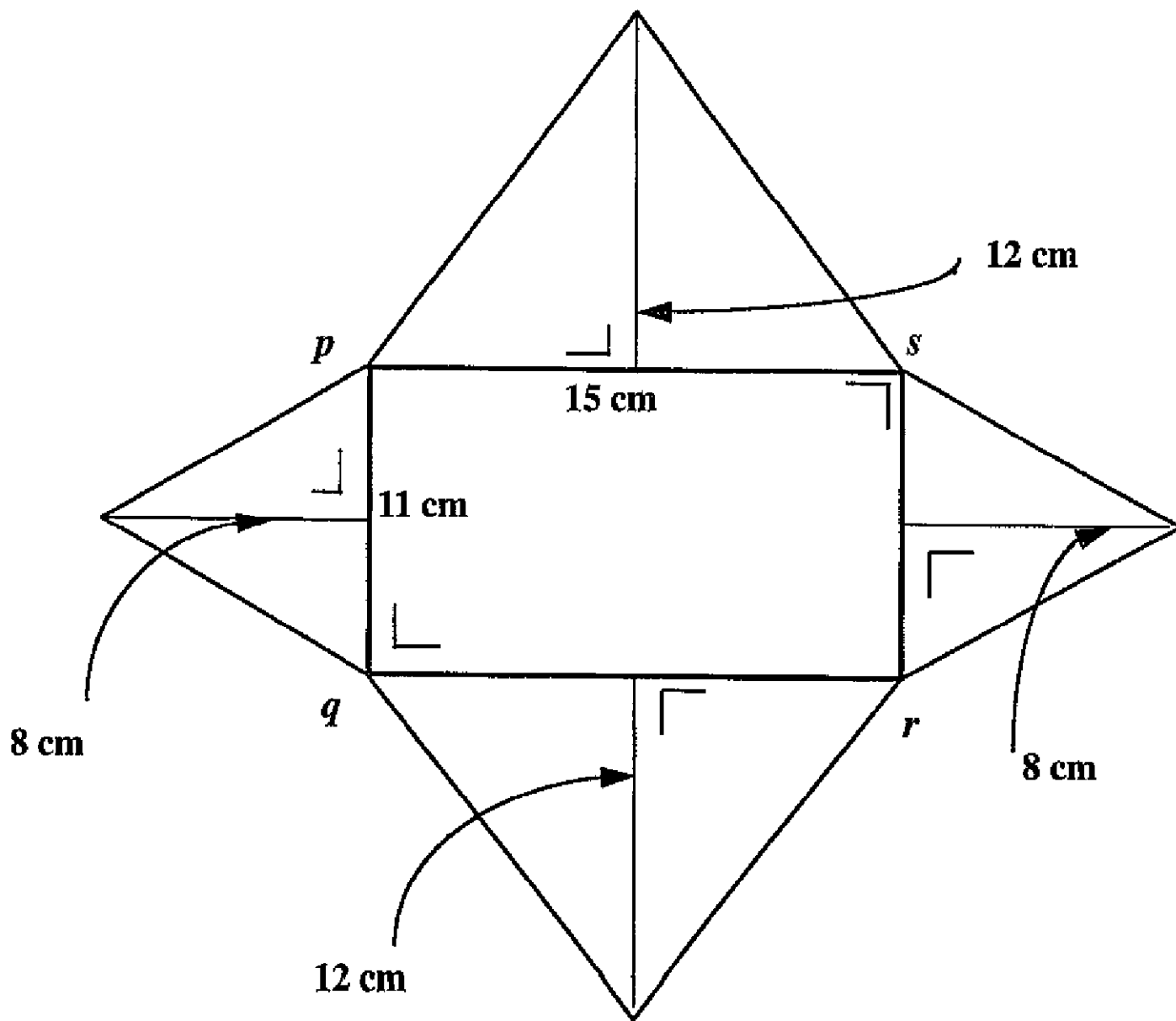


- (b) The diagram below shows an opened-out, flattened envelope.

$pqrs$ is a rectangle with measurements shown.

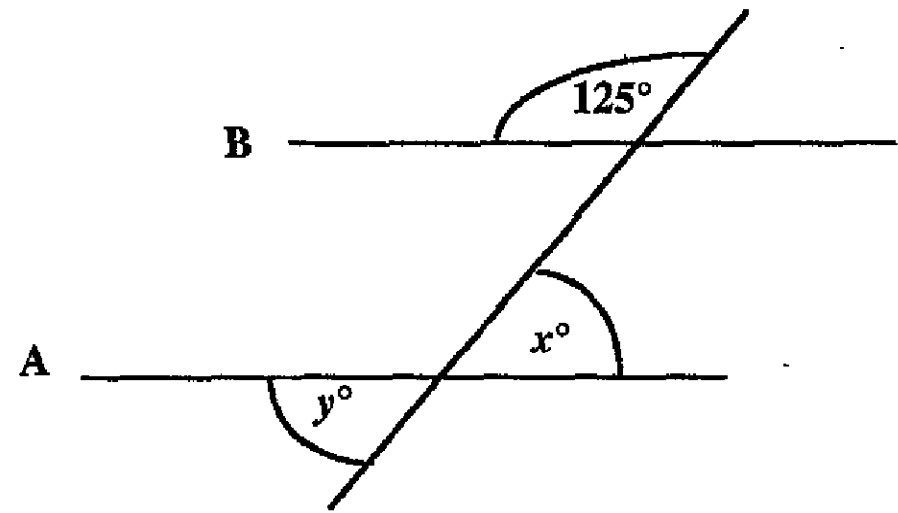
The measurements of the opened-out parts are also shown. These parts are triangles.

Calculate the area of the opened-out envelope.



3. (a) The diagram shows parallel lines A and B.

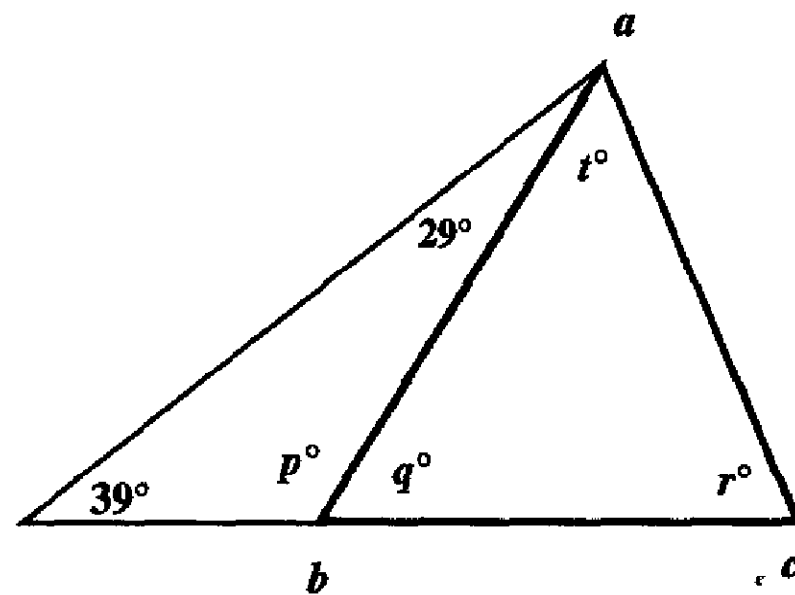
Write down the value of x and the value of y .



- (b) An isosceles triangle abc is shown in heavy line in the diagram with $|ab| = |ac|$.

Find the value of

- (i) p
(ii) q
(iii) r
(iv) t .

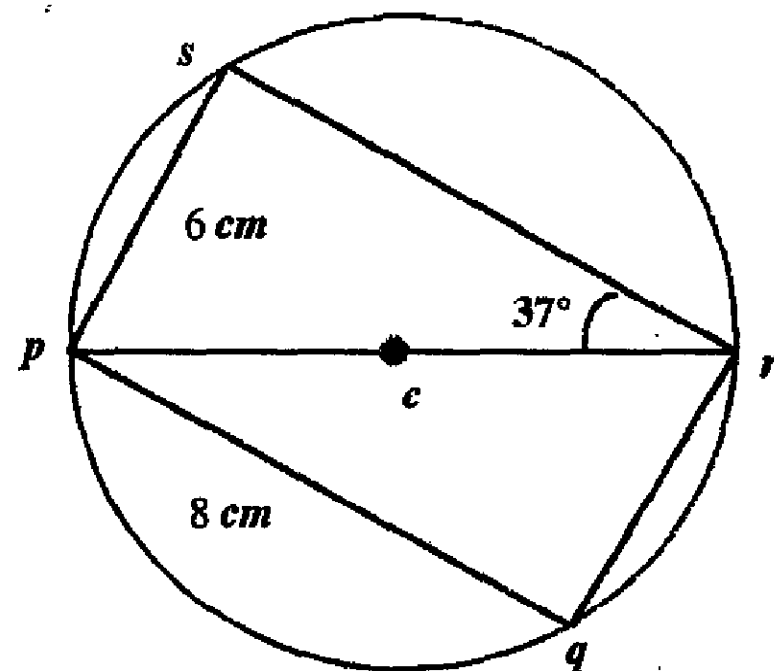


- (c) A circle, centre c , is drawn around the parallelogram $pqrs$ so as to touch the points p , q , r and s .

$|pq| = 8 \text{ cm}$, $|ps| = 6 \text{ cm}$ and $|\angle prs| = 37^\circ$.

Find the value of

- (i) $|\angle rsp|$
(ii) $|\angle rps|$
(iii) $|pr|$.

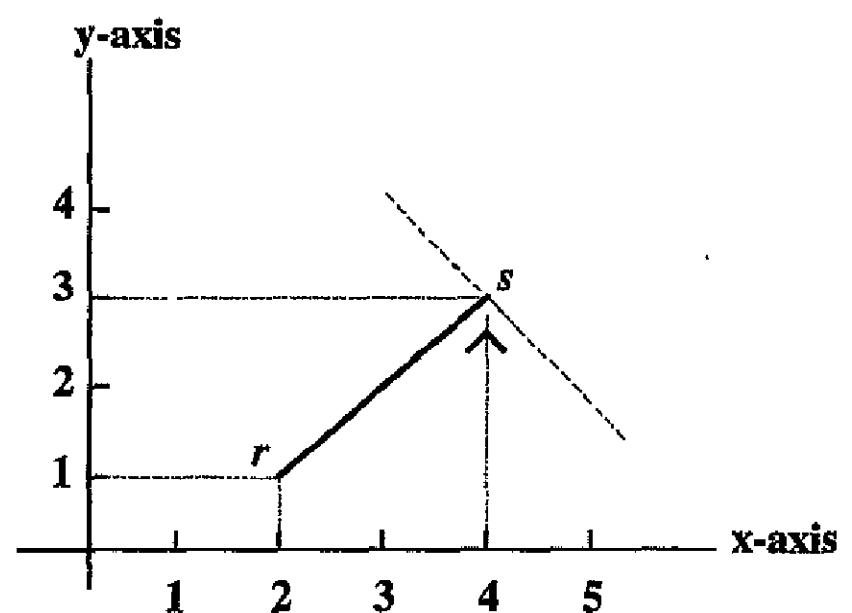


4. (a) The coordinates of points m and n are $(1,3)$ and $(4,7)$, respectively. Find the length of $[mn]$.

- (b) The slope of a line is 2. Find the equation of the line, if the point $(4,5)$ is on the line.

- (c) The diagram shows a line segment $[rs]$.

- (i) Write down the coordinates of r and the coordinates of s .
(ii) Find the slope of rs .
(iii) Find the equation of the line through s perpendicular to rs . It is shown here as a broken line.



5. (a) In the right-angled triangle pqr

$|pq| = 5 \text{ cm}, |qr| = 12 \text{ cm}.$

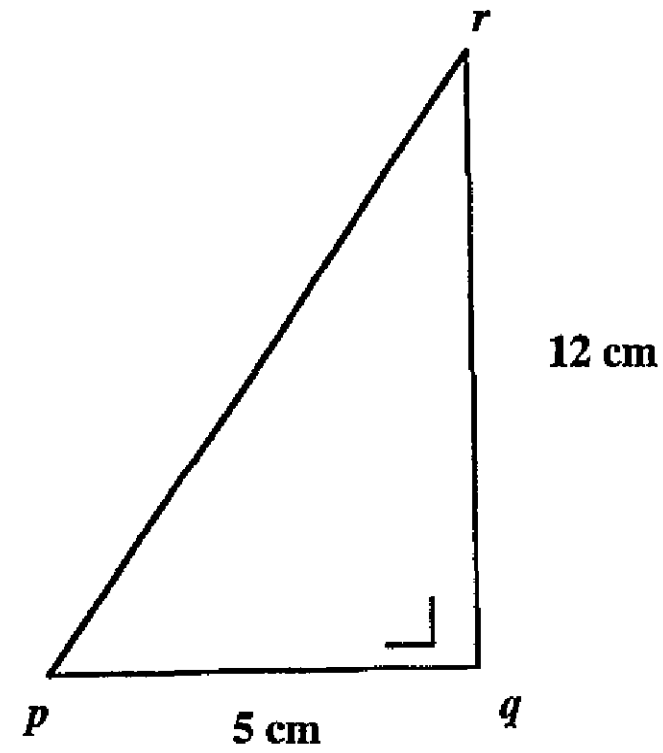
(i) Show how to calculate the length, 13 cm, of $[pr]$.

(ii) Write the following as fractions using 5, 12 and 13 as lengths:

$\sin \angle rpq$

$\cos \angle rpq$

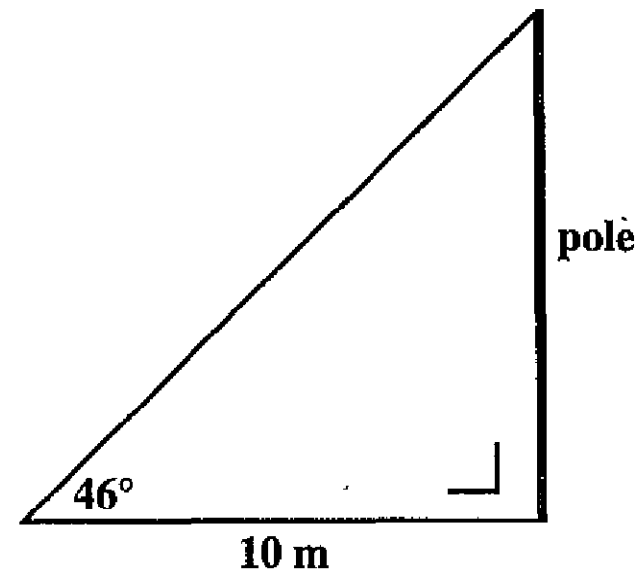
$\tan \angle rpq.$



(b) An upright pole casts a shadow 10 m long.

The angle of elevation of the end point of the shadow to the top of the pole is 46° .

Calculate the height of the pole correct to one decimal place.



6. (a) A group of actors visits schools to perform plays. The actors know

2 plays in Irish

4 plays in English

3 plays in French.

A programme in a school requires three plays, one in each language. How many different programmes can the actors put together?

(b) A fair, six-sided die shows each of the numbers 1 to 6. A different number is shown on each side. Two such dice X and Y are rolled at the same time. An outcome is got by adding the numbers which are face up when the dice come to rest.

(a 4 on X and a 3 on Y is one way to get 7; a 3 on X and a 4 on Y is a different way.)

Use the grid shown, or otherwise, and find

(i) the total number of ways there are to get outcomes

(ii) the most frequent outcome

(iii) the probability of the most frequent outcome

(iv) the probability of an outcome of 11 (eleven)

(v) the probability of outcomes which exclude 11.

Y \ X	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

7. (a) The pupils in a class of 20 were measured for height. There were

3 pupils under 150 cm
12 pupils under 160 cm
18 pupils under 170 cm.
All twenty were under 180 cm.

How many were

- (i) 150 cm or taller but smaller than 160 cm?
- (ii) 160 cm or taller but smaller than 170 cm?
- (iii) 170 cm or taller but smaller than 180 cm?

(b) In an interview an employer looked for five qualities in the candidates

Punctuality (P)
Dress sense (D)
Ability to Speak clearly (S)
Information about the job (I)
Qualifications (Q).

There were ten marks for each quality.

There were two outstanding candidates, Sonia and Michelle.

The marks they got are given below.

The weightings for each quality are shown in bold print on the last line of the box.

	P	D	S	I	Q
Sonia	10	7	8	6	9
Michelle	10	8	7	9	8
Weighting	2	4	6	2	10

Calculate the *weighted mean mark* for each candidate.

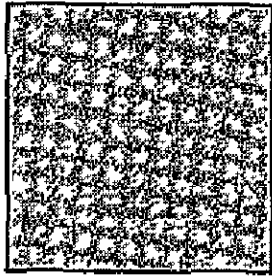
(c) State the mean and calculate the standard deviation of the numbers

30 40 50 60

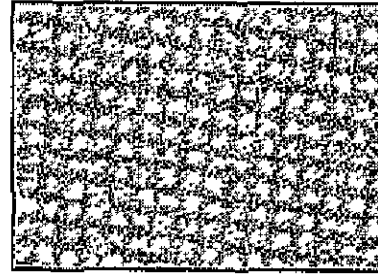
correct to one decimal place.

8. (a) Sketch the following shapes and show all their axes of symmetry:

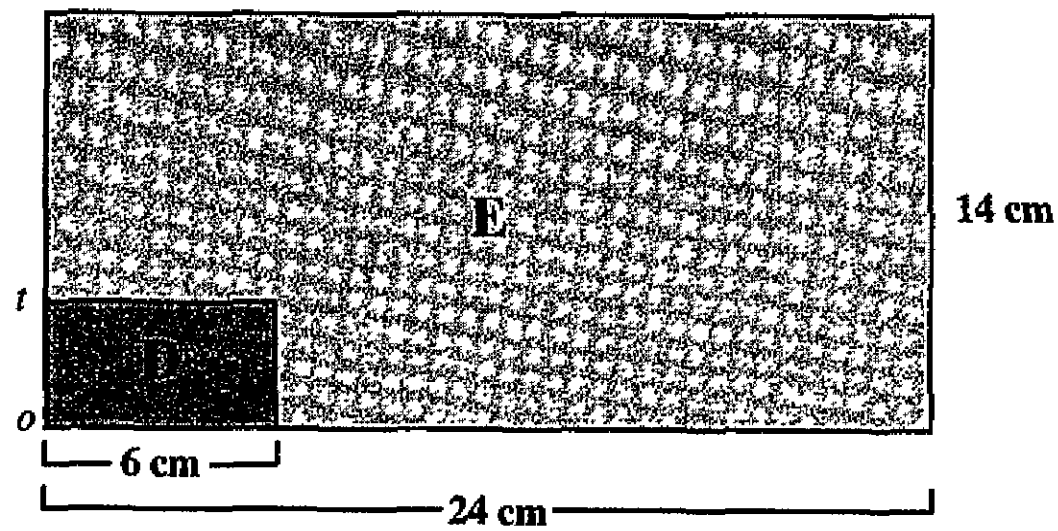
(i) Square



(ii) Rectangle



(b) The diagram below shows a rectangle, **D**, and its enlargement, **E**. The centre of enlargement is **O**.



Calculate

- (i) the scale factor of the enlargement
- (ii) the length of $[Ot]$
- (iii) the value of $\frac{\text{the area } E}{\text{the area } D}$.

(c) Construct a parallelogram pqr so that

$$|pq| = 7 \text{ cm}, \quad |ps| = 5 \text{ cm}, \quad |\angle qps| = 55^\circ.$$

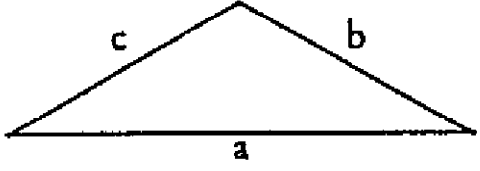

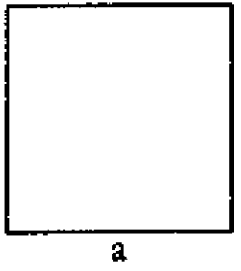
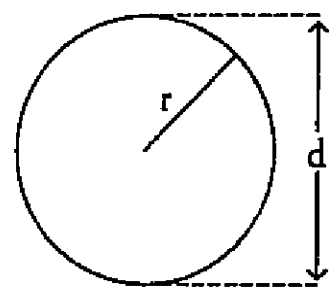
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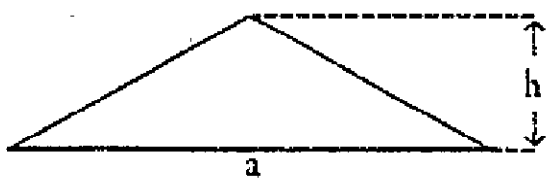
SCRÚDÚ NA hARDTEISTIMÉIREACHTA
LEAVING CERTIFICATE EXAMINATION


MATAMAITIC - BONNLEIBHÉAL
MATHEMATICS - FOUNDATION LEVEL

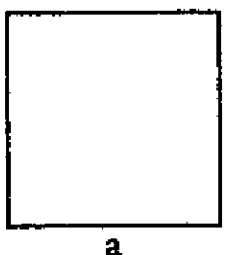
FOIRMLÍ LE hAGHAIDH PÁIPÉIR 2
FORMULAE FOR PAPER 2

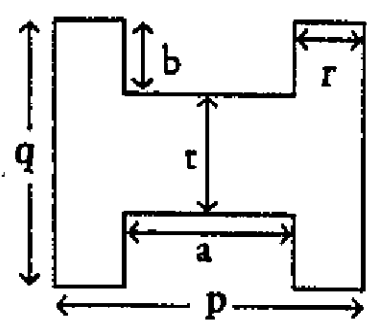
FAD		LENGTH			
FAD	FOIRMLÍ	TRIANTÁN	TRIANGLE	LENGTH	FORMULAE
$Fad = a + b + c$	$a = Fad - b - c$ $b = Fad - a - c$ $c = Fad - a - b$			$Length = a + b + c$	$a = Length - b - c$ $b = Length - a - c$ $c = Length - a - b$
FAD	FOIRMLÍ	DRONUILLEOG	RECTANGLE	LENGTH	FORMULAE
$Fad = 2(a + b)$ $= 2a + 2b$	$a = \frac{(Fad - 2b)}{2}$ $b = \frac{(Fad - 2a)}{2}$			$Length = 2(a + b)$ $= 2a + 2b$	$a = \frac{(Length - 2b)}{2}$ $b = \frac{(Length - 2a)}{2}$
FAD	FOIRMLÍ	CEARNÓG	SQUARE	LENGTH	FORMULAE
$Fad = 4a$	$a = \frac{Fad}{4}$			$Length = 4a$	$a = \frac{Length}{4}$
FAD	FOIRMLÍ	CIORCAL	CIRCLE	LENGTH	FORMULAE
$Fad = 2\pi r$ $Fad = \pi d$	$d = 2r, r = \frac{d}{2}$ $r = \frac{Fad}{2\pi}$ $d = \frac{Fad}{\pi}$			$Length = 2\pi r$ $Length = \pi d$	$d = 2r, r = \frac{d}{2}$ $r = \frac{Length}{2\pi}$ $d = \frac{Length}{\pi}$

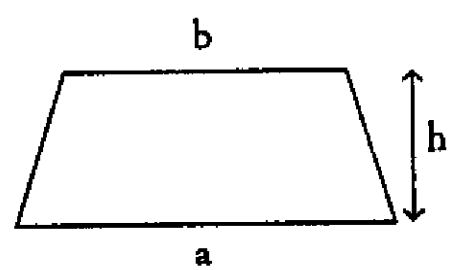
ACHAR	AREA
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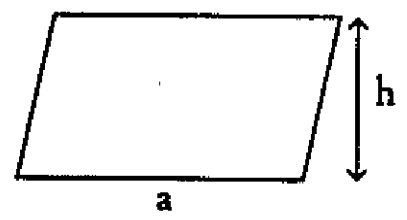
ACHAR	FOIRMLÍ	TRIANTÁN TRIANGLE	AREA	FORMULAE
$Achar = \frac{ah}{2}$	$a = \frac{2(Achar)}{h}$ $h = \frac{2(Achar)}{a}$		$Area = \frac{ah}{2}$	$a = \frac{2(Area)}{h}$ $h = \frac{2(Area)}{a}$

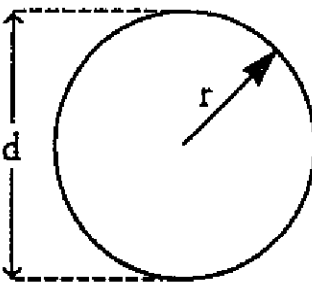
ACHAR	FOIRMLÍ	DRONUILEOG RECTANGLE	AREA	FORMULAE
$Achar = ab$	$a = \frac{Achar}{b}$ $b = \frac{Achar}{a}$		$Area = ab$	$a = \frac{Area}{b}$ $b = \frac{Area}{a}$

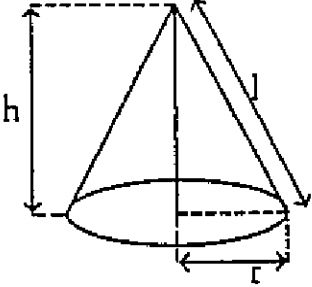
ACHAR	FOIRMLÍ	CEARNÓG SQUARE	AREA	FORMULAE
$Achar = a^2$	$a = \sqrt{Achar}$		$Area = a^2$	$a = \sqrt{Area}$

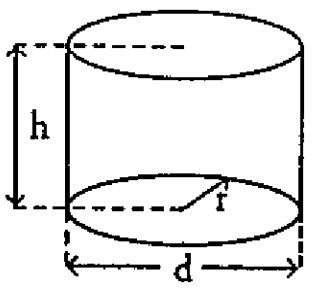
ACHAR	FOIRMLÍ	FÍOR-H H-FIGURE	AREA	FORMULAE
$Achar = pq - 2ab$ $Achar = at + 2qr$ <p>Nóta: $p = a + 2r$ $q = 2b + t$</p>	$p = \frac{(Achar + 2ab)}{q}$ $q = \frac{(Achar + 2ab)}{p}$ $a = \frac{(pq - Achar)}{2b}$ $b = \frac{(pq - Achar)}{2a}$		$Area = pq - 2ab$ $Area = at + 2qr$ <p>Note: $p = a + 2r$ $q = 2b + t$</p>	$p = \frac{(Area + 2ab)}{q}$ $q = \frac{(Area + 2ab)}{p}$ $a = \frac{(pq - Area)}{2b}$ $b = \frac{(pq - Area)}{2a}$

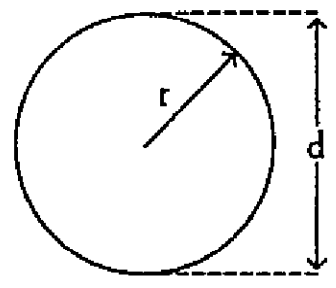
ACHAR	FOIRMLÍ	TRAIPÉISIAM TRAPEZIUM	AREA	FORMULAE
$Achar = \frac{h(a+b)}{2}$	$a = \frac{2(Achar)}{h} - b$ $b = \frac{2(Achar)}{h} - a$ $h = \frac{2(Achar)}{(a+b)}$		$Area = \frac{h(a+b)}{2}$	$a = \frac{2(Area)}{h} - b$ $b = \frac{2(Area)}{h} - a$ $h = \frac{2(Area)}{(a+b)}$

ACHAR	FOIRMLÍ	COMHTHREOMHARAN PARALLELOGRAM	AREA	FORMULAE
$Achar = ah$	$a = \frac{Achar}{h}$ $h = \frac{Achar}{a}$		$Area = ah$	$a = \frac{Area}{h}$ $h = \frac{Area}{a}$

ACHAR	FOIRMLÍ	DIOSCA	DISC	AREA	FORMULAE
$Achar = \pi r^2$ $Achar = \frac{\pi d^2}{4}$	$r = \sqrt{\frac{Achar}{\pi}}$ $d = \sqrt{\frac{4(Achar)}{\pi}}$			$Area = \pi r^2$ $Area = \frac{\pi d^2}{4}$	$r = \sqrt{\frac{Area}{\pi}}$ $d = \sqrt{\frac{4(Area)}{\pi}}$

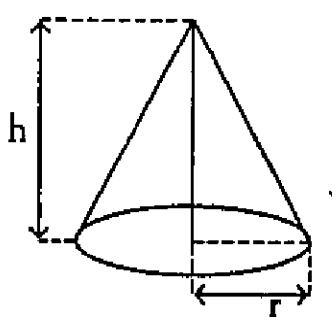
ACHAR	FOIRMLÍ	DRONCHÓN	RIGHT CONE	AREA	FORMULAE
$Achar = \pi r l$ Nóta: $l^2 = r^2 + h^2$	$r = \frac{Achar}{\pi l}$ $l = \frac{Achar}{\pi r}$			$Area = \pi r l$ Note: $l^2 = r^2 + h^2$	$r = \frac{Area}{\pi l}$ $l = \frac{Area}{\pi r}$

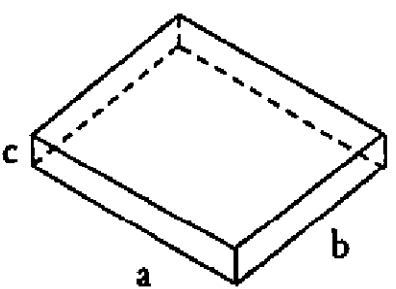
ACHAR	FOIRMLÍ	SORCÓIR	CYLINDER	AREA	FORMULAE
$Achar = 2\pi r h$ $Achar = \pi d h$	$r = \frac{Achar}{2\pi h}$ $h = \frac{Achar}{2\pi r}$ $d = \frac{Achar}{\pi h}$ $h = \frac{Achar}{\pi d}$			$Area = 2\pi r h$ $Area = \pi d h$	$r = \frac{Area}{2\pi h}$ $h = \frac{Area}{2\pi r}$ $d = \frac{Area}{\pi h}$ $h = \frac{Area}{\pi d}$

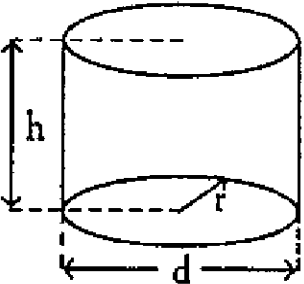
ACHAR	FOIRMLÍ	SEÁR	SPHERE	AREA	FORMULAE
$Achar = 4\pi r^2$ $Achar = \pi d^2$	$r = \sqrt{\frac{Achar}{4\pi}}$ $d = \sqrt{\frac{Achar}{\pi}}$			$Area = 4\pi r^2$ $Area = \pi d^2$	$r = \sqrt{\frac{Area}{4\pi}}$ $d = \sqrt{\frac{Area}{\pi}}$

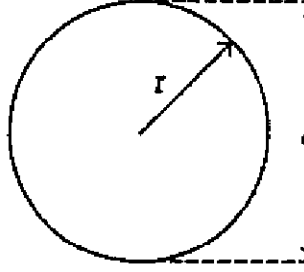
TOIRT

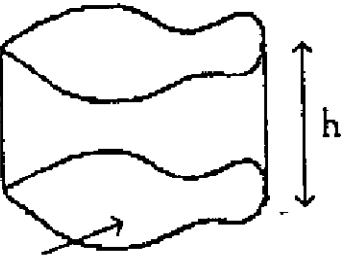
VOLUME

TOIRT	FOIRMLÍ	DRONCHÓN	RIGHT CONE	VOLUME	FORMULAE
$Toirt = \frac{\pi r^2 h}{3}$	$r = \sqrt{\frac{3(Toirt)}{\pi h}}$ $h = \frac{3(Toirt)}{\pi r^2}$			$Volume = \frac{\pi r^2 h}{3}$	$r = \sqrt{\frac{3(Volume)}{\pi h}}$ $h = \frac{3(Volume)}{\pi r^2}$

TOIRT	FOIRMLÍ	BLOC DRONULLEOGACH	RECTANGULAR BLOCK	VOLUME	FORMULAE
$Toirt = abc$	$a = \frac{Toirt}{bc}$ $b = \frac{Toirt}{ac}$ $c = \frac{Toirt}{ab}$			$Volume = abc$	$a = \frac{Volume}{bc}$ $b = \frac{Volume}{ac}$ $c = \frac{Volume}{ab}$

TOIRT	FOIRMLÍ	SORCÓIR	CYLINDER	VOLUME	FORMULAE
$Toirt = \pi r^2 h$ $Toirt = \frac{\pi d^2 h}{4}$	$h = \frac{Toirt}{\pi r^2}$ $h = \frac{4(Toirt)}{\pi d^2}$ $r = \sqrt{\frac{Toirt}{\pi h}}$ $d = \sqrt{\frac{4(Toirt)}{\pi h}}$			$Volume = \pi r^2 h$ $Volume = \frac{\pi d^2 h}{4}$	$h = \frac{Volume}{\pi r^2}$ $h = \frac{4(Volume)}{\pi d^2}$ $r = \sqrt{\frac{Volume}{\pi h}}$ $d = \sqrt{\frac{4(Volume)}{\pi h}}$

TOIRT	FOIRMLÍ	SFÉAR	SPHERE	VOLUME	FORMULAE
$Toirt = \frac{4\pi r^3}{3}$ $Toirt = \frac{\pi d^3}{6}$	$r = \sqrt[3]{\frac{3(Toirt)}{4\pi}}$ $d = \sqrt[3]{\frac{6(Toirt)}{\pi}}$			$Volume = \frac{4\pi r^3}{3}$ $V = \frac{\pi d^3}{6}$	$r = \sqrt[3]{\frac{3(Volume)}{4\pi}}$ $d = \sqrt[3]{\frac{6(Volume)}{\pi}}$

TOIRT	FOIRMLÍ	DRONPHRÍOSMA	RIGHT PRISM	VOLUME	FORMULAE
$Toirt = (Achar)h$	$Achar = \frac{Toirt}{h}$ $h = \frac{Toirt}{Achar}$			$Volume = (Area)h$	$Area = \frac{Volume}{h}$ $h = \frac{Volume}{Area}$
		Achar = Achar an Bhoinn Area = Area of Base			

Foirmle don fad:

Distance formula:

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Foirmle don fána:

Slope formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Foirmle don lárphointe:

Midpoint formula:

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

Cóthromóid líne:

Equation of a line:

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

Riail Simpson: Garachar = $\frac{h}{3}$ (Ceád + Deireadh + C.D.R.C.) áit gur Céad = an Cheád ordanáid, Deireadh = an ordanáid Deireanach, C.D.R.C. = Corr ordanáidí faoi Dó + Réidh ordanáidí faoi Ceathair, h = an t-eatramh.

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.