

AN ROINN OIDEACHAIS
LEAVING CERTIFICATE EXAMINATION, 1997

17843

MATHEMATICS – FOUNDATION LEVEL

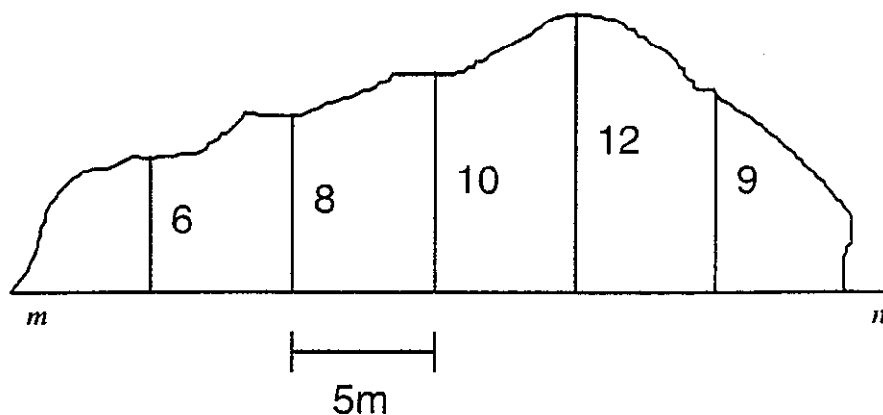
PAPER 2 (300 marks)

FRIDAY, 13 JUNE – MORNING 9.30 – 12.00

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

A sheet of formulae is available from the Superintendent

1. (a) The volume of a right circular cone is 942 cm^3 .
Its height measures 9 cm.
Find the length of the base radius. Take the value of π to be 3.14.
- (b) A site was for sale.
Its area was found using Simpson's rule.



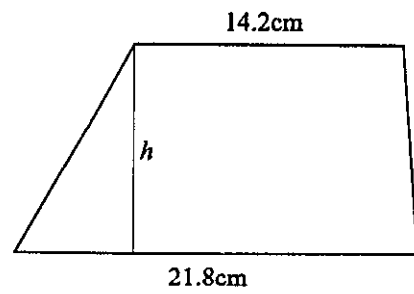
The offsets of 6, 8, 10, 12 and 9 metres were measured at intervals of 5 metres along mn .

Calculate the area, correct to the nearest metre.

- (c) A rectangular piece of cardboard measured 56 cm by 40 cm. Discs of diameter length 8 cm were to be cut from the piece. Find the greatest number of discs which could be obtained.

2. (a) The area of a trapezium is 180 cm^2 .
The parallel sides measure 21.8 cm
and 14.2 cm .

Find the height, h .

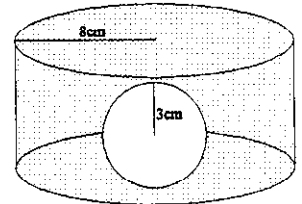


- (b) (i) A cylinder has a volume of 1406.72 cm^3
with radius length 8 cm .

Calculate its height, if π is taken to be 3.14 .

- (ii) The cylinder was filled to the brim with
water. A sphere of radius length 3 cm
was gently pushed under the water.

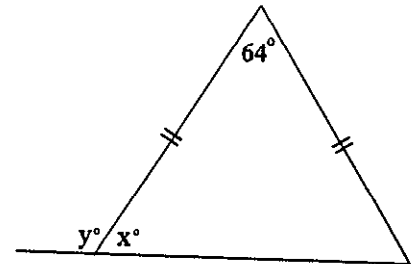
What volume of water spilled out if π is taken as 3.14 ?



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

One angle measures 64° .

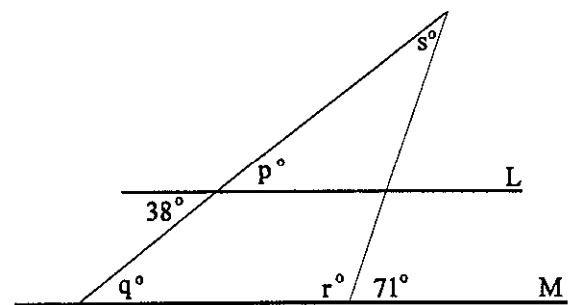
Find the value of x and the value of y .



- (b) In the diagram the lines
L and M are parallel.

Write down the value of

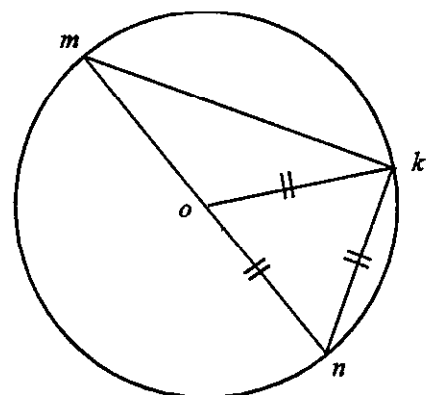
- (i) p
(ii) q
(iii) r
(iv) s .



- (c) $[mn]$ is the diameter of a circle, centre o .
 $|no| = |ok| = |kn|$.

Write down the measure of the angles

- (i) $\angle nko$
(ii) $\angle okm$
(iii) $\angle mok$.

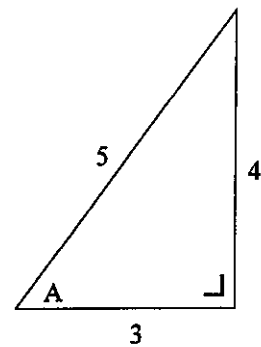


4. (a) Find the distance between the points which have coordinates $(2, 2)$ and $(-4, 10)$.
- (b) Given $r(2, 2)$ and $s(4, 8)$ are two points, find
- the coordinates of t the mid-point of $[rs]$.
 - the slope of rs .
 - the equation of the line which includes t and is perpendicular to rs .
- (c) $3x + 2y - 8 = 0$ is the equation of a line.
- Write down the coordinates of three points of the line taking x values 0, 2 and 4.
 - Draw the graph of the line.
 - Use the graph to find k if $(k, 1.5)$ is on the line.

5. (a) The diagram shows a right-angled triangle having sides of length 3, 4 and 5 cm and an angle named A.

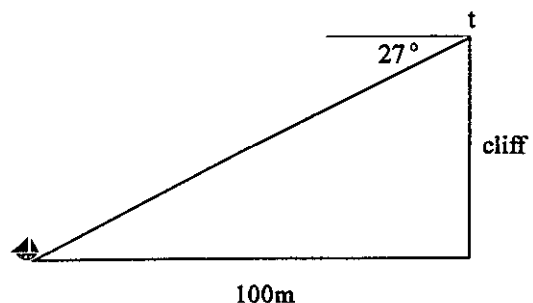
Write down the value of

- $\sin A$
- $\cos A$
- $\tan A$.



- (b) A person at t on top of a vertical cliff lowers her sight 27° from the horizontal in order to look directly at a boat out at sea.

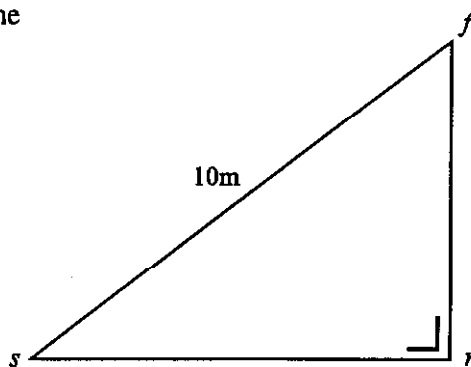
The boat is 100 m from the foot of the cliff. Find the height of t above sea level to the nearest metre.



- (c) A swimmer at s is 10 m from the steps of a swimming pool at f .

He swims to n the nearest point of the pool wall.

Find $|sn|$, if $\sin \angle nfs = 0.8$.



OVER →

6. (a) A factory makes electric kettles.
Kettle sizes are 1 litre, 2 litre and 3 litre.

Kettles are cream or brown or black.

How many different types of kettle does the factory make?

- (b) A person tosses a fair coin and then picks a card at random from a pack of 52 playing cards.

What is the probability

- (i) of a "head" or an ace
- (ii) of a "head" and a heart.

- (c) A fair coin is tossed three times.

Write out all the possible outcomes. (For example, one outcome could be two "heads" and a "tail", HHT).

What is the probability of

- (i) two "heads" and a "tail"?
- (ii) no "heads"?
- (iii) "heads" on the first and second toss?

7. (a) Draw a histogram using the data in the Table:

Time in minutes	0-5	5-10	10-20
Frequency	8	12	12

- (b) The cumulative frequency table below shows the number of cars that had entered a car-park by

ten minutes after eight : 2 cars
twenty minutes after eight: 8 cars, etc.

Time	0810	0820	0830	0840	0850	0900
Number of cars	2	8	20	35	46	50

Draw the cumulative frequency curve. Put the "number of cars" on the vertical axis.

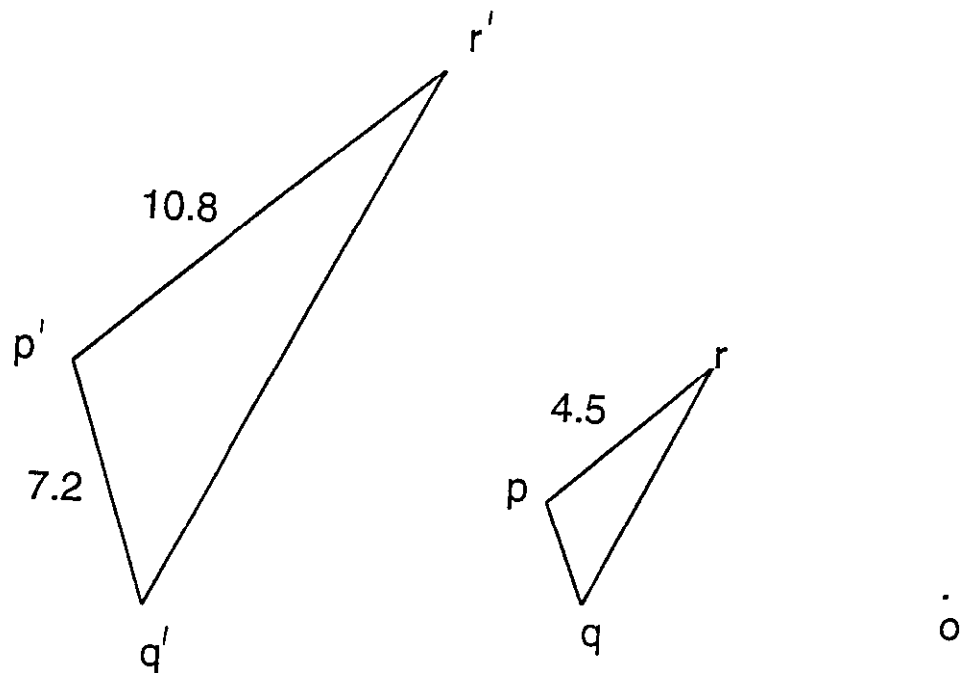
Use the curve to estimate the number of cars that had entered by 0845.

- (c) Calculate, correct to two places of decimals, the standard deviation of

4, 6, 8, 12.

8. (a) Construct an angle of 60° using a ruler and compass only.
Show the construction lines.

- (b) The triangle $p'q'r'$ is the enlargement of the triangle pqr . The centre of enlargement is o .



- (i) Show how to calculate the scale factor, 2.4, of the enlargement if $|pr| = 4.5$ cm and $|p'r'| = 10.8$ cm.
- (ii) Find $|pq|$ if $|p'q'| = 7.2$ cm.
- (iii) Calculate the area of the triangle pqr correct to two decimal places when the area of the triangle $p'q'r' = 33$ cm².

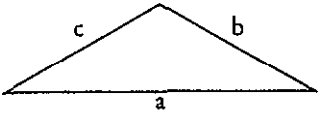
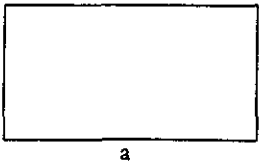
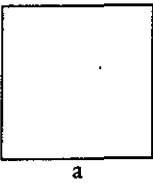
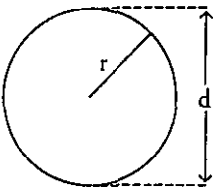
AN ROINN OIDEACHAIS

SCRÚDÚ NA hARDTEISTIMÉIREACHTA
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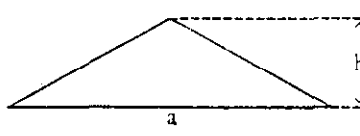
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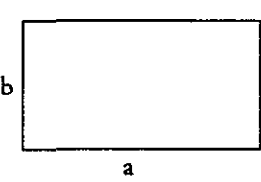
MATAMAITIC - BONNLEIBHÉAL
MATHEMATICS - FOUNDATION LEVEL

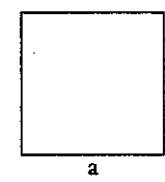
FOIRMLÍ LE hAGHAIDH PÁIPÉIR 2
FORMULAE FOR PAPER 2

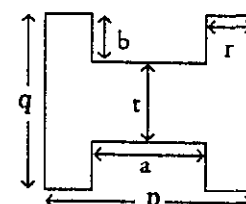
FAD		LENGTH			
FAD	FOIRMLÍ	TRIANTÁN	TRIANGLE	LENGTH	FORMULAE
$Fad = a + b + c$	$a = Fad - b - c$ $b = Fad - a - c$ $c = Fad - a - b$			$Length = a + b + c$	$a = Length - b - c$ $b = Length - a - c$ $c = Length - a - b$
FAD	FOIRMLÍ	DRONUILLEOG	RECTANGLE	LENGTH	FORMULAE
$Fad = 2(a + b)$ $= 2a + 2b$	$a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

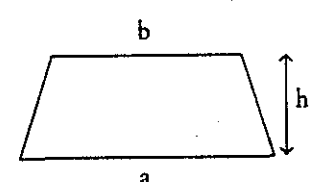
ACHAR	AREA
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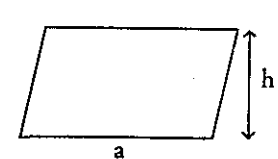
ACHAR	FOIRMLÍ	TRIANTÁN TRIANGLE	AREA	FORMULAE
$Achar = \frac{ah}{2}$	$a = \frac{2(Achar)}{h}$ $h = \frac{2(Achar)}{a}$		$Area = \frac{ah}{2}$	$a = \frac{2(Area)}{h}$ $h = \frac{2(Area)}{a}$

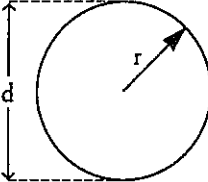
ACHAR	FOIRMLÍ	DRONUILLEOG RECTANGLE	AREA	FORMULAE
$Achar = ab$	$a = \frac{Achar}{b}$ $b = \frac{Achar}{a}$		$Area = ab$	$a = \frac{Area}{b}$ $b = \frac{Area}{a}$

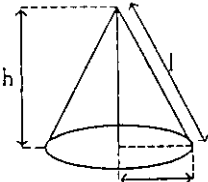
ACHAR	FOIRMLÍ	CEARNÓG SQUARE	AREA	FORMULAE
$Achar = a^2$	$a = \sqrt{Achar}$		$Area = a^2$	$a = \sqrt{Area}$

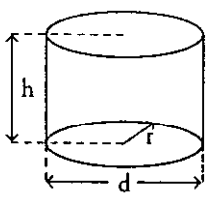
ACHAR	FOIRMLÍ	FÍOR - H H - FIGURE	AREA	FORMULAE
$Achar = pq - 2ab$ $Achar = at + 2qr$ Nóta: $p = a + 2r$ $q = 2b + t$	$p = \frac{(Achar + 2ab)}{q}$ $q = \frac{(Achar + 2ab)}{p}$ $a = \frac{(pq - Achar)}{2b}$ $b = \frac{(pq - Achar)}{2a}$		$Area = pq - 2ab$ $Area = at + 2qr$ Note: $p = a + 2r$ $q = 2b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

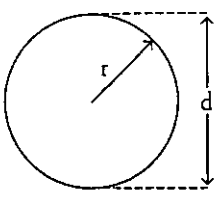
ACHAR	FOIRMLÍ	TRAIPÉISIAM TRAPEZIUM	AREA	FORMULAE
$Achar = \frac{h(a+b)}{2}$	$a = \frac{2(Achar)}{h} - b$ $b = \frac{2(Achar)}{h} - a$ $h = \frac{2(Achar)}{(a+b)}$		$Area = \frac{h(a+b)}{2}$	$a = \frac{2(Area)}{h} - b$ $b = \frac{2(Area)}{h} - a$ $h = \frac{2(Area)}{(a+b)}$

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

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

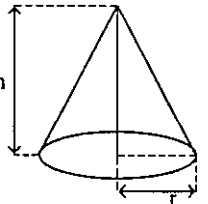
ACHAR	FOIRMLÍ	DRONCHÓN	RIGHT CONE	AREA	FORMULAE
$Achar = \pi r l$ Nóta: $l^2 = r^2 + h^2$	$r = \frac{Achar}{\pi l}$ $l = \frac{Achar}{\pi r}$			$Area = \pi r l$ Note: $l^2 = r^2 + h^2$	$r = \frac{Area}{\pi l}$ $l = \frac{Area}{\pi r}$

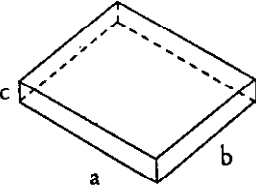
ACHAR	FOIRMLÍ	SORCÓIR	CYLINDER	AREA	FORMULAE
$Achar = 2\pi r h$ $Achar = \pi d h$	$r = \frac{Achar}{2\pi h}$ $h = \frac{Achar}{2\pi r}$ $d = \frac{Achar}{\pi h}$ $h = \frac{Achar}{\pi d}$			$Area = 2\pi r h$ $Area = \pi d h$	$r = \frac{Area}{2\pi h}$ $h = \frac{Area}{2\pi r}$ $d = \frac{Area}{\pi h}$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

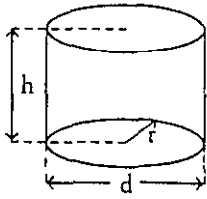
ACHAR	FOIRMLÍ	SFEAR	SPHERE	AREA	FORMULAE
$Achar = 4\pi r^2$ $Achar = \pi d^2$	$r = \sqrt{\frac{Achar}{4\pi}}$ $d = \sqrt{\frac{Achar}{\pi}}$			$Area = 4\pi r^2$ $Area = \pi d^2$	$r = \sqrt{\frac{Area}{4\pi}}$ $d = \sqrt{\frac{Area}{\pi}}$

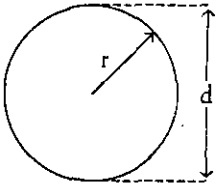
TOIRT

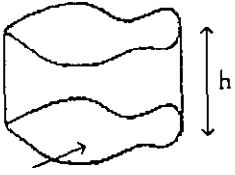
VOLUME

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	SORCOIR	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	SFEAR	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	DRONPHRIOSMA	RIGHT PRISM	VOLUME	FORMULAE
$Toirt = (Achar)h$	$Achar = \frac{Toirt}{h}$ $h = \frac{Toirt}{Achar}$			$Volume = (Area)h$	$Area = \frac{Volume}{h}$ $h = \frac{Volume}{Area}$
		<p>Achar = Achar an Bhoinn Area = Area of Base</p>			

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.