AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

LEAVING CERTIFICATE EXAMINATION, 2002

MATHEMATICS - FOUNDATION LEVEL

PAPER 2 (300 marks)

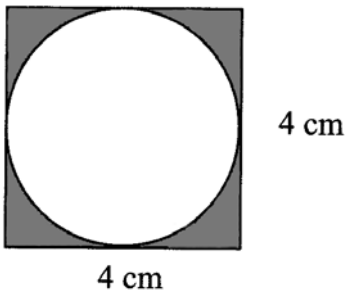
MONDAY, 10th JUNE - MORNING, 9.30 - 12.00

Attempt **SIX QUESTIONS** (50 marks each).

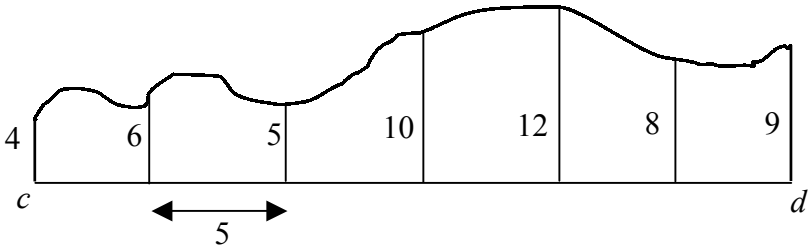
Marks may be lost if necessary work is not clearly shown.
A sheet of formulae will be given to you by the Superintendent.

---

1. **(a)** A circle is inscribed in a square as shown.
Find the area of the shaded region, correct to one place of decimals.
Take $\pi = 3.14$



(b) The diagram below shows a stained section of carpet.



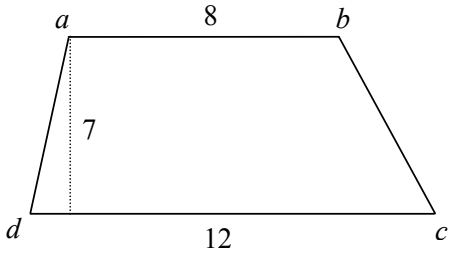
Offsets of lengths 4, 6, 5, 10, 12, 8 and 9 centimetres are measured at intervals of 5 centimetres along [*cd*].

(i) Calculate the area of the stained section using Simpson's Rule.

(ii) Find, in cm^2, the area of the smallest rectangular rug that could be used to cover the stained section.

2. **(a)** A trapezium *abcd* has the following dimensions:
the length of [*ab*] is 8 cm,
the length of [*dc*] is 12 cm,
and the height is 7 cm.

Find the area of the trapezium.

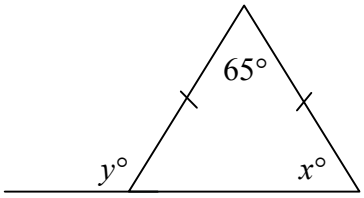


(b) **(i)** Find, in cm^3, the volume of a metal sphere of diameter 18 cm.
Take $\pi = 3.14$

(ii) Two such spheres are melted down and recast as a single cylinder of diameter 12 cm.

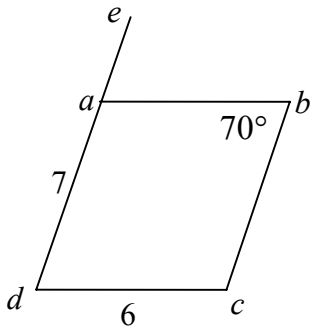
Calculate the height of the cylinder.

3. **(a)** The triangle in the diagram is isosceles.
Find the value of x and the value of y.



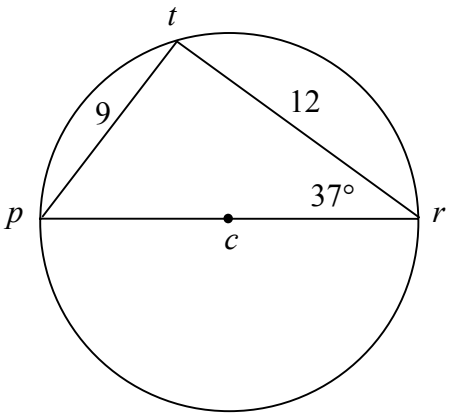
(b) $abcd$ is a parallelogram.
$|ad| = 7$ cm, $|dc| = 6$ cm and $|\angle abc| = 70°$.

Find:
(i) the length of $[bc]$
(ii) the measure of $\angle bcd$
(iii) the measure of $\angle adc$
(iv) the measure of $\angle eab$.



(c) $[pr]$ is a diameter of a circle with centre c. t is a point on the circle.
$|pt| = 9$ cm, $|rt| = 12$ cm and $|\angle prt| = 37°$.

Find:
(i) the measure of $\angle ptr$
(ii) the measure of $\angle tpr$
(iii) the length of $[cr]$
(iv) the area of the triangle tpr.



4. **(a)** Plot the points $a(-4, 3)$ and $b(6, 5)$ on graph paper.
Find the midpoint of $[ab]$.

(b) $p(-4, -5)$ and $q(3, -7)$ are points.

(i) Find the length of $[pq]$.
(ii) Find the slope of pq.
(iii) Find the equation of the line pq.

(c) The line K has equation $3y = -4x + 9$.
(i) Write down the slope of K.
(ii) Show that the point $(0, 3)$ lies on the line K.
(iii) Find the equation of the line L, which passes through the point $(1, -2)$ and is perpendicular to K.

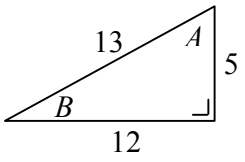
5. **(a)** Given that $\tan A = \frac{12}{5}$,

write down the value of:

(i) $\sin A$

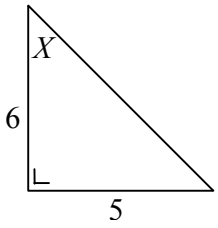
(ii) $\cos A$

(iii) $\tan B$.



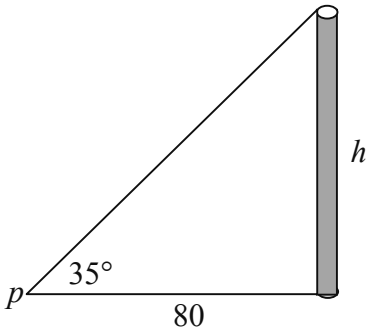
(b) Find $\tan X$ and write your answer as a decimal.

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



(c) A point p is on level ground, 80 m from the foot of a pole. From p, the angle of elevation of the top of the pole is $35°$.

Calculate the height h of the pole, correct to the nearest metre.



6. **(a)** A school requires a new sports kit, consisting of a jersey, shorts and socks. A local factory makes the following:

four different types of jersey
two different types of shorts
three different types of socks.

Calculate how many different kit selections are possible.

(b) A bag contains 4 white balls, 3 red balls, 2 green balls and 1 yellow ball. A ball is picked at random from the bag. What is the probability that:

(i) the ball is red

(ii) the ball is <u>not</u> green

(iii) the ball is red or white?

(c) 200 eggs were classified according to size (large or medium), and colour (brown or white). The results are given in the following table:

	Brown	White
Large	40	80
Medium	32	48

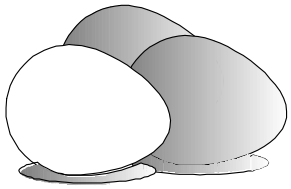
An egg is chosen at random. What is the probability that it is

(i) a white egg

(ii) a brown egg

(iii) a large, brown egg

(iv) a medium, white egg?



7. **(a)** Draw a histogram to illustrate the data given in the table below.
Put the time in minutes on the horizontal axis.

Time in minutes	0 – 5	5 – 10	10 – 20
Frequency	6	14	12

(b) The following table gives the results of 100 students in an examination:

Marks	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
No. of students	15	25	35	20	5

Note: 0 – 20 means 0 marks or more, but less than 20 marks.

Copy and complete the cumulative frequency table below:

Marks	< 20	< 40	< 60	< 80	< 100
No. of students	15	40			

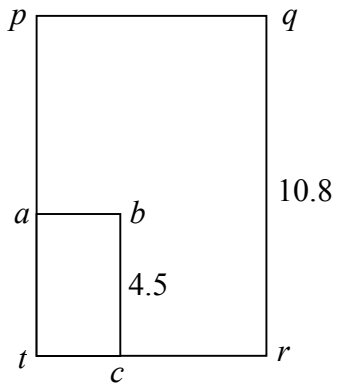
Draw the cumulative frequency curve, putting the number of students on the vertical axis. Use your curve to estimate the median mark.

(c) The ages of five students are: 15, 17, 18, 17, 18.
(i) Find the mean age.
(ii) Find the standard deviation, correct to two places of decimals.

8. **(a)** Use a ruler and compass to construct an angle of $60°$.
Show the construction lines clearly.

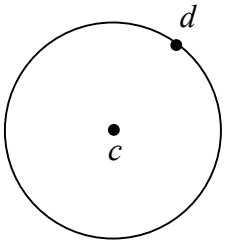
(b) The rectangle *pqrt* is an enlargement of the rectangle *abct*.

$|qr| = 10.8$ cm and $|bc| = 4.5$ cm.



(i) Write down the centre of the enlargement.
(ii) Calculate the scale factor of the enlargement.
(iii) The area of the rectangle *pqrt* is 92.16 cm^2.
Find the area of the rectangle *abct*.

(c) Construct a circle of radius 4 cm.



Mark *c*, the centre of the circle, and *d*, a point on the circle, as shown.

Show how to construct the tangent to the circle at the point *d*.