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JUNIOR CERTIFICATE EXAMINATION, 2002

MATHEMATICS - ORDINARY LEVEL

MONDAY, 10 JUNE - MORNING, 9.30 to 12.00

PAPER 2 (300 marks)

Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).

WARNING: Marks may be lost if necessary work is not clearly shown.
Mathematics Tables may be obtained from the Superintendent.

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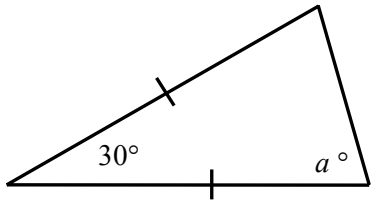
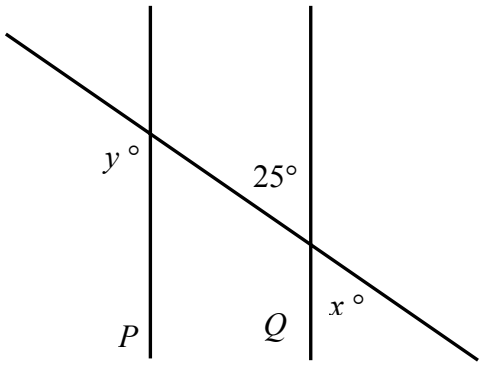
1. **(i)** Two angles of a triangle measure 74°50′ and 79°40′.
What is the measure of the third angle?

(ii) Calculate the value of a in the diagram.

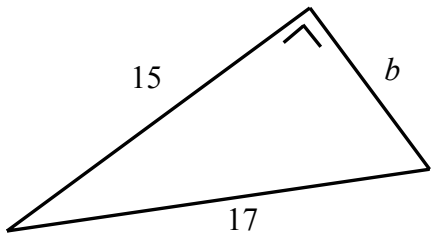


(iii) P and Q are parallel lines.
Calculate the value of x and the value of y.

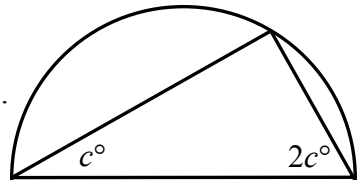


(iv) Construct the parallelogram $abcd$ in which
$|ab| = 6.5$ cm, $|bc| = 5$ cm and $|\angle abc| = 110°$.
Measure the length of $[bd]$, giving your answer in centimetres.

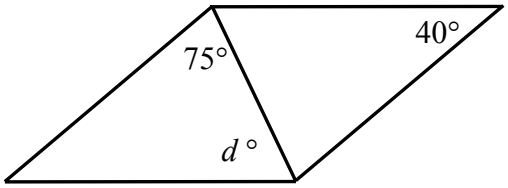
(v) In a right-angled triangle, the hypotenuse has length 17. One of the other sides has length 15.
Find b, the length of the third side.



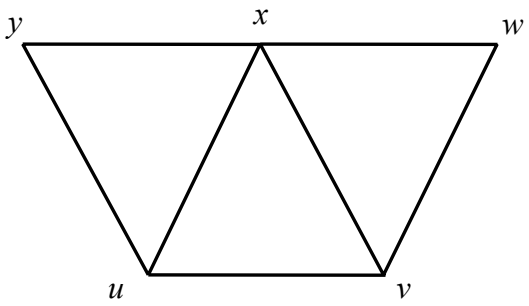
(vi) The diagram shows a triangle in a semi-circle.
Calculate the value of c.



(vii) The diagram shows a parallelogram.
Calculate the value of d.



(viii) $uvxy$ and $uvwx$ are parallelograms.
Copy the diagram and shade in the image of the triangle wxv under the translation $\overrightarrow{xy}$.



(ix) The equation of a line is $3x + 4y = 12$.
Find the slope of the line.
(The equation of a line with slope m is $y = mx + c$.)

(x) $A = 30°$. Use the book of Tables to find $\sin 2A$.

2. **(a)** Write 42 as a percentage of 70.

(b) Using 1 euro = 0.92 dollars,

(i) convert 250 euro into dollars

(ii) convert 138 dollars into euro.

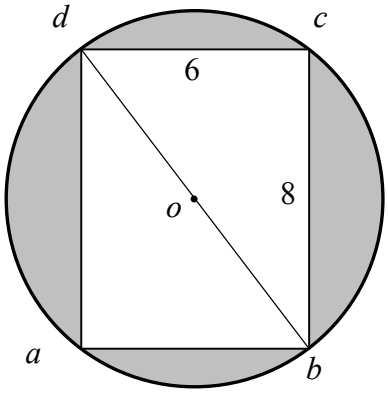
(c) $abcd$ is a rectangle, $|bc| = 8$, $|cd| = 6$
and o is the centre of the circle.

(i) Write down the area of the rectangle.

(ii) Calculate $|bd|$.

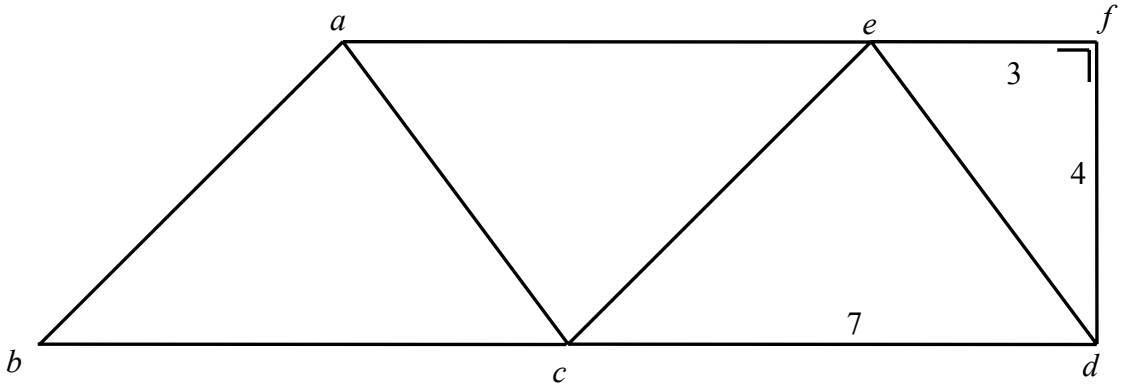
(iii) Find the area of the circle. Take $\pi = 3.14$.

(iv) Find the area of the shaded region.



3. *abce* and *acde* are parallelograms, and $|\angle dfe| = 90°$.

$|cd| = 7$, $|df| = 4$ and $|ef| = 3$.



(i) Name two angles equal in measure to $\angle bac$.

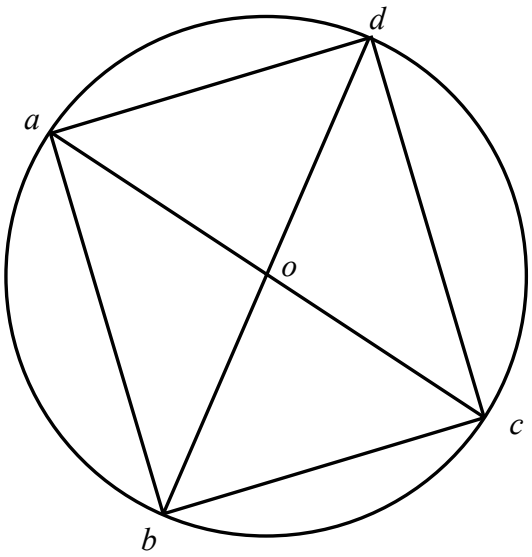
(ii) Write down the image of [*ed*] under the translation $\vec{cb}$.

(iii) Calculate the length of [*ac*].

(iv) Explain why [*bc*] and [*cd*] are equal in length.

(v) Calculate the area of the figure *ecdf*.

4. [*ac*] and [*bd*] are diameters of a circle.
The centre of the circle is *o*.



(i) Write down the measure of $\angle abc$.

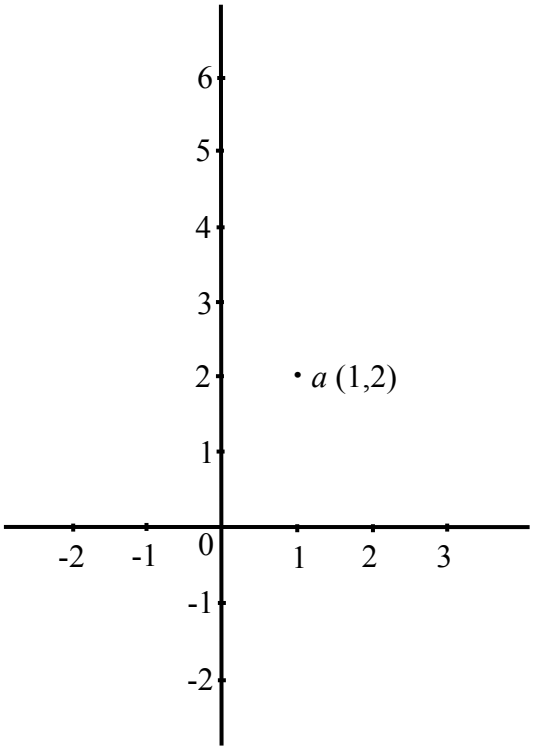
(ii) Name one isosceles triangle,
giving a reason for your answer.

(iii) Name two triangles that are congruent.

(iv) The area of the triangle *abc* is 30.
The length of [*bc*] is 5.
Calculate the length of [*ab*].

(v) Calculate the radius of the circle.

5. The point $a(1, 2)$ is shown on the diagram.



(i) Copy the diagram and plot the point $b(-1, 6)$.

(ii) Find the slope of ab.

(iii) Find the equation of the line ab.

(iv) The line ab intersects the x-axis at the point p. Calculate the co-ordinates of the point p.

(v) Find the co-ordinates of the point q, the midpoint of $[ab]$.

(vi) Find $|pq|$, correct to one decimal place.

Formulae:

Slope formula: $\dfrac{y_2 - y_1}{x_2 - x_1}$

Equation of a line: $y - y_1 = m(x - x_1)$ or $y = mx + c$

Midpoint formula: $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

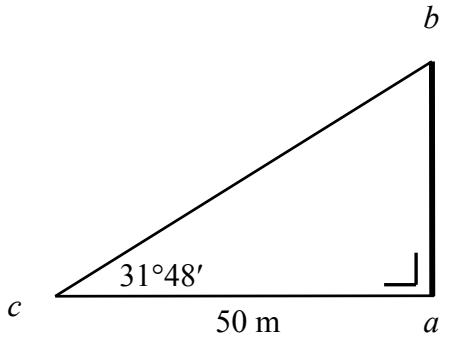
Distance formula: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

6. **(a)** Use the book of Tables to find:

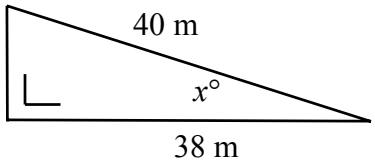
(i) Sin 54°6′

(ii) Sin 54°10′.

(b) A mast $[ab]$ is held upright by a cable $[bc]$, as shown. Find $|ab|$, the height of the mast.



(c) **(i)** Write $\dfrac{38}{40}$ as a decimal.



(ii) Hence find the value of x in the diagram.