

Right-angled triangles (Intermediate UKMT)

These questions must be attempted ***without a calculator***

Topics covered in the questions below may not necessarily be from the topic of the title.

1. In Britain in 1996 they consumed on average 9.6 kg of bananas per person per year (that is, around 60 bananas each). In some parts of Africa, the consumption of bananas is as high as 250 kg of bananas per person per year.

Roughly how many bananas is that?

- A 4 or 5 a day B 1 or 2 a day C 4 or 5 a week D 1 or 2 a week E 4 or 5 a month

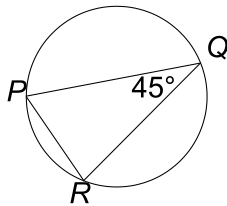
2. In March 1998 a book called "*The Shadow of the East*" was returned to a library in Sussex. It had been borrowed on January 3rd 1924! The library charges a fine of 60p per week for overdue books.

Approximately how big a fine should the person who returned the book have paid?

- A £45 B £180 C £230 D £2200 E £16 000

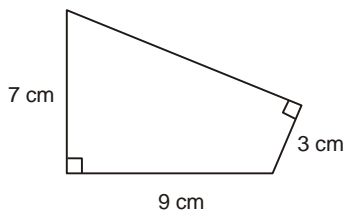
3. P, Q, R are points on the circumference of a circle of radius 4 cm. $\angle PQR = 45^\circ$.

What is the length of chord PR ?



- A 4 cm B $3\sqrt{3}$ cm C $4\sqrt{2}$ cm D 5 cm E 6 cm

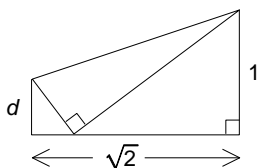
4. What, in cm^2 , is the area of this quadrilateral?



- A 48 B 50 C 52 D 54 E 56

5. A rectangular sheet of paper with sides 1 and $\sqrt{2}$ has been folded once as shown, so that one corner just meets the opposite long edge.

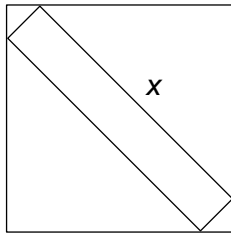
What is the value of the length d ?



- A $\frac{1}{2}$ B $\sqrt{2} - 1$ C $\frac{7}{16}$ D $\sqrt{3} - \sqrt{2}$ E $\frac{\sqrt{2}}{3}$

6. The diagram shows a $1 \times x$ rectangular plank which fits neatly inside a 10×10 square frame.

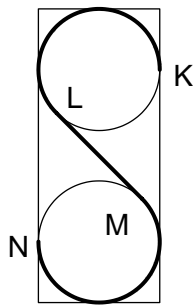
What is the value of x ?



- A $10 + 2\sqrt{2}$ B $10\sqrt{2} - 1$ C $10\sqrt{2} - 2$ D $10 + \sqrt{2}$ E 12

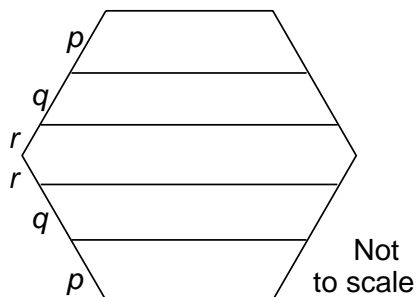
7. In the diagram, the letter S is made from two arcs, KL and MN , which are each five-eighths of the circumference of a circle of radius 1, and the line segment LM , which is tangent to both circles. At points K and N , common tangents to the two circles touch one of the circles.

What is the length LM ?



- A $\frac{3}{2}$ B $3 - \sqrt{2}$ C 2 D $\frac{3\sqrt{2}}{2}$ E $1 + \sqrt{2}$

8. This regular hexagon has been divided into four trapezia and one hexagon. If each of the five sections has the same perimeter, what is the ratio of the lengths p , q and r ?



- A 8 : 2 : 1 B 12 : 4 : 1 C 9 : 3 : 1 D 6 : 3 : 1 E 9 : 4 : 1