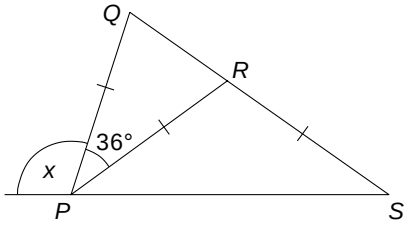
Angles in triangles (Intermediate UKMT)

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 the diagram $PQ = PR = RS$

What is the size of angle x?



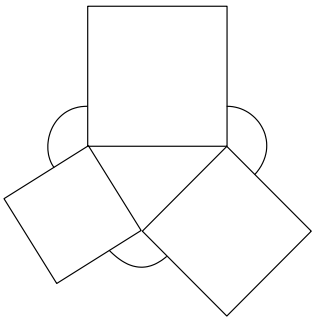
A 54° B 72° C 90° D 108° E 144°

2. In Worcestershire, Wyre Piddle is 12km south of the village of North Piddle and Abbotts Morton is 12km east of North Piddle.

What is the direction of Abbotts Morton from Wyre Piddle?

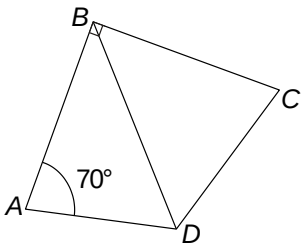
A South East B South West C North East D North West E West

3. The diagram shows three squares drawn on the sides of a triangle.
What is the sum of the three marked angles?



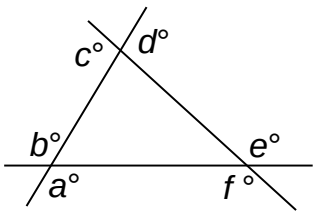
A 180° B 270° C 360° D 450° E It depends on the shape of the triangle

4. In the quadrilateral $ABCD$, $\angle ABC = 90°$, $\angle BAD = 70°$ and $AB = BD = BC$.
What is the size of $\angle BDC$?



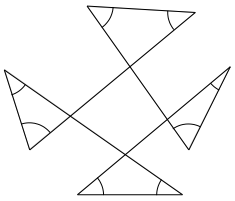
A 40° B 50° C 65° D 70° E 80°

5. What is the value of $a + b + c + d + e + f$?



A 360 B 540 C 720 D 900 E it depends on the triangle

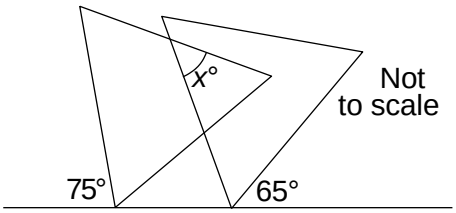
6. In the diagram, what is the sum of the marked angles?



A 180° B 360° C 450° D 540° E 720°

7. The diagram shows two equilateral triangles.

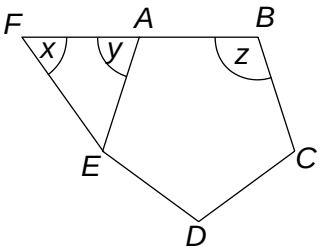
What is the value of x?



A 70 B 60 C 50 D 40 E 30

8. *ABCDE* is a regular pentagon. *FAB* is a straight line and *FA* = *AB*.

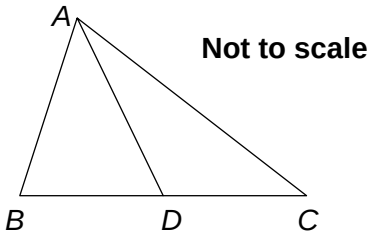
What is the ratio $x : y : z$?



A 1 : 2 : 3 B 2 : 2 : 3 C 2 : 3 : 4 D 3 : 4 : 5 E 3 : 4 : 6

9. In the triangle *ABC*, *AD* = *BD* = *CD*

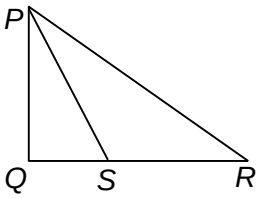
What is the size of angle *BAC*?



A 60° B 75° C 90° D 120° E more information is needed

10. In the triangle *PQR*, there is a right angle at *Q* and angle *QPR* is 60°. The bisector of the angle *QPR* meets *QR* at *S*, as shown.

What is the ratio $QS : SR$?



A 1:1 B 1: $\sqrt{2}$ C 1: $(3 - \sqrt{3})$ D 1 : $\sqrt{3}$ E 1:2