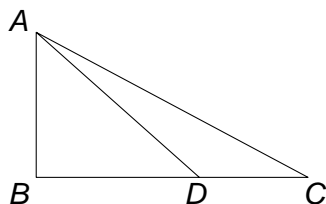


## Pythagoras (Intermediate UKMT)

These questions must be attempted without a calculator

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

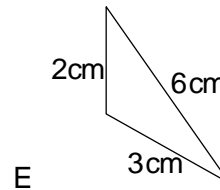
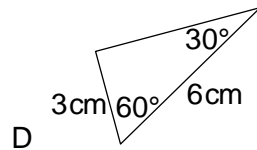
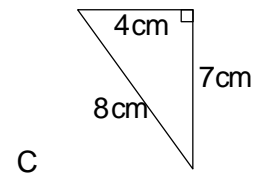
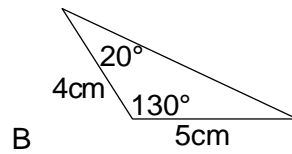
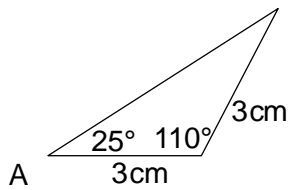
- Which of the following numbers is not a perfect square?  
A 16                      B 36                      C 64                      D 80                      E 100
- Given that  $x$  and  $y$  are positive whole numbers and  $x^2 + 2 = y^3$ , which of the following is a possible value of  $x$ ?  
A 2                      B 3                      C 4                      D 5                      E 6
- In the right-angled triangle  $ABC$ ,  $BD = 8$ ,  $AD = 10$  and  $AD = DC$ .  
What is the area of triangle  $ADC$ ?



- A 80                      B 40                      C 30                      D 24                      E 20
- In a right angled triangle the two shorter sides have lengths 10cm and 5cm.  
Which of the following approximations is closest to the length of the hypotenuse?  
A 11cm                      B 11.5cm                      C 12cm                      D 12.5cm                      E 13cm
  - If two of the sides of a right-angled triangle are 5 cm and 6 cm long, how many possibilities are there for the length of the third side?  
A 0                      B 1                      C 2                      D 3                      E 4
  - I have four rectangular pieces of thin hardboard whose dimensions (in cm) are  $55 \times 85$ ,  $65 \times 75$ ,  $65 \times 85$  and  $90 \times 105$ .  
Without bending the hardboard, how many of these can I get through an open rectangular window measuring  $60 \text{ cm} \times 80 \text{ cm}$ ?  
A 0                      B 1                      C 2                      D 3                      E 4

7. Only one of these triangles can actually be made.

Which is it?

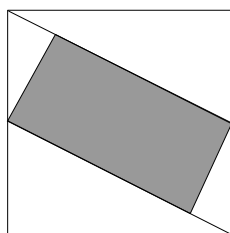


If two of the sides of a right-angled triangle are 5 cm and 6 cm long, how many possibilities are there for the length of the third side?

- A 0    B 1    C 2    D 3    E 4

8. The diagram shows a square with two lines from a corner to the middle of an opposite side. The rectangle fits exactly inside these two lines and the square itself.

What fraction of the square is occupied by the shaded rectangle?



- A  $\frac{1}{3}$     B  $\frac{2}{5}$     C  $\frac{3}{10}$     D  $\frac{1}{2}$     E  $\frac{3}{8}$