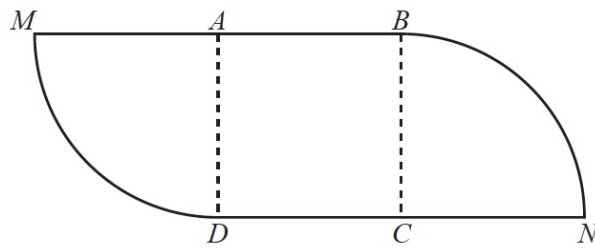**Problem 0580/43/M/J/23/ Q9**

(a)

M A B

NOT TO
SCALE

D C N

The diagram shows a shape made from a square $ABCD$ and two equal sectors of a circle.
The square has side 11 cm.
MAB and DCN are straight lines.

(i) Calculate the area of the shape.

area of square = $11 \times 11 = 121$ cm^2

MA = CN = 11 cm as they are
radius of sectors and sides of
square

area of sector = $\dfrac{\pi \times 11^2}{2}$ = 190 cm^2

311.0 .... cm^2 [3]

(ii) Calculate the perimeter of the shape.

2× Arc length of sectors + Sum of
two opposite sides of square
+ MA + CN

$2 \times \dfrac{2\pi \, 11}{4}$ + 11 + 11 + 11 + 11

78.6 .... cm [3]

(b)
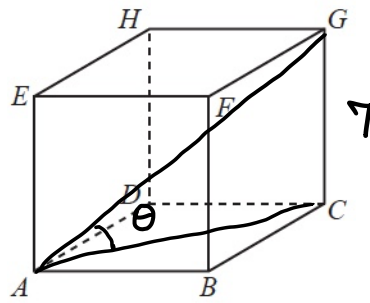
NOT TO SCALE

The diagram shows a cube $ABCDEFGH$ of edge 7 cm.

Calculate the angle between AG and the base of the cube.

$$AC = \sqrt{AB^2 + BC^2}$$

$$= \sqrt{49 + 49} = 9.89 \text{ or } 7\sqrt{2}$$

$$\theta = \tan^{-1} \frac{7}{7\sqrt{2}} = 35.3°$$

........35.3°............ [4]