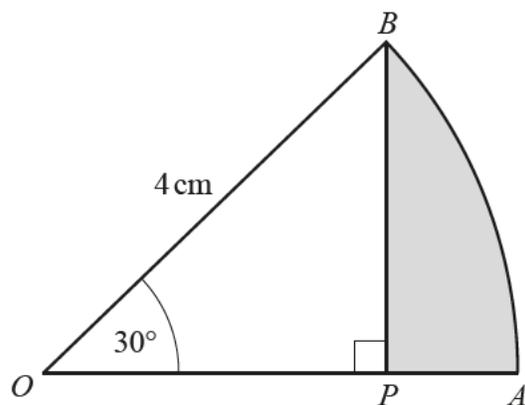


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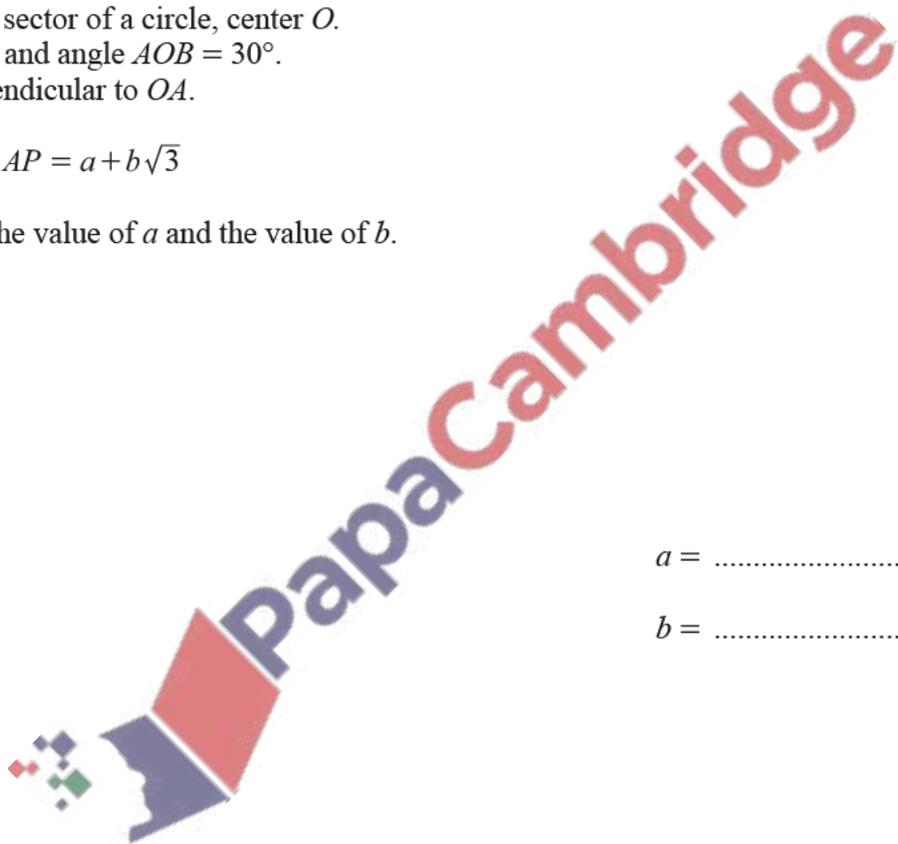
$OAB$  is the sector of a circle, center  $O$ .  
 $OB = 4$  cm and angle  $AOB = 30^\circ$ .  
 $BP$  is perpendicular to  $OA$ .

(a)  $AP = a + b\sqrt{3}$

Find the value of  $a$  and the value of  $b$ .

$a = \dots\dots\dots$

$b = \dots\dots\dots$  [3]

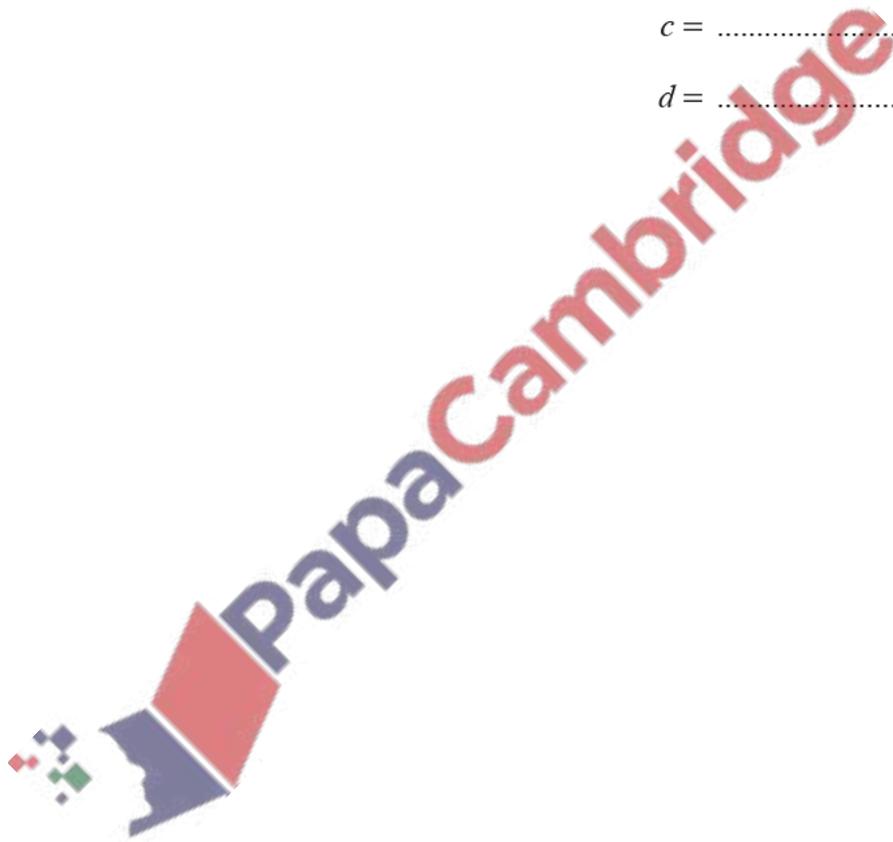


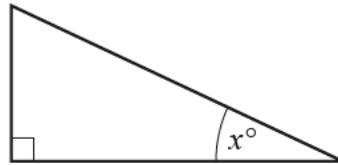
(b) The area of the shaded region is  $c\pi + d\sqrt{3}$ .

Find the value of  $c$  and the value of  $d$ .

$c = \dots\dots\dots$

$d = \dots\dots\dots$  [3]





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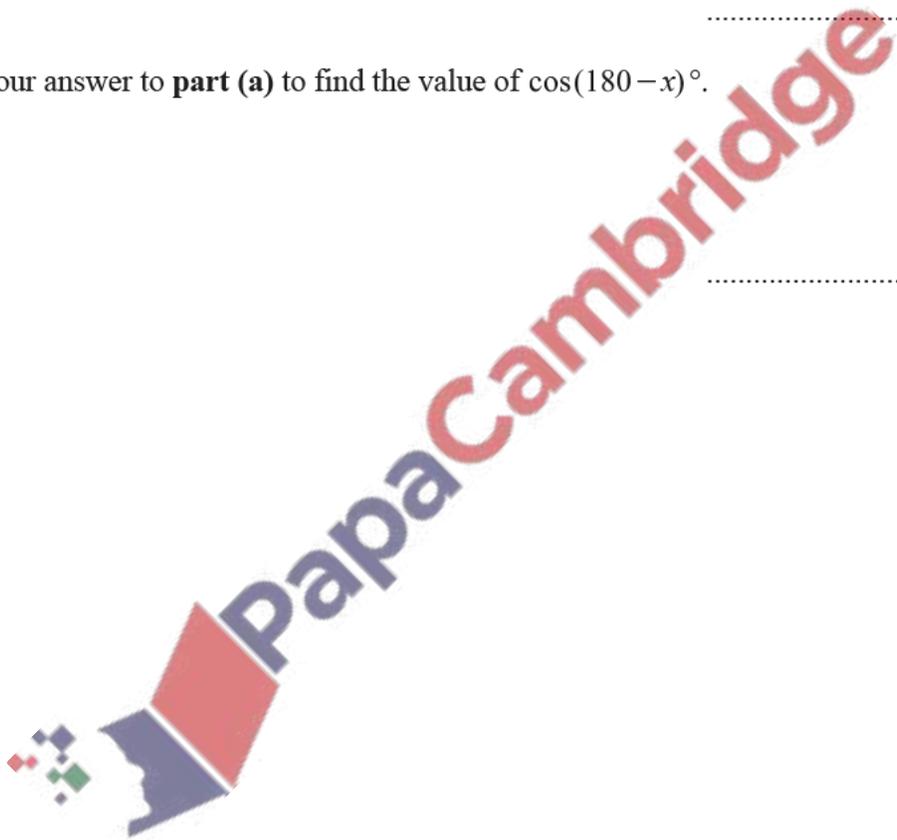
$$\sin x^\circ = \frac{3}{5}$$

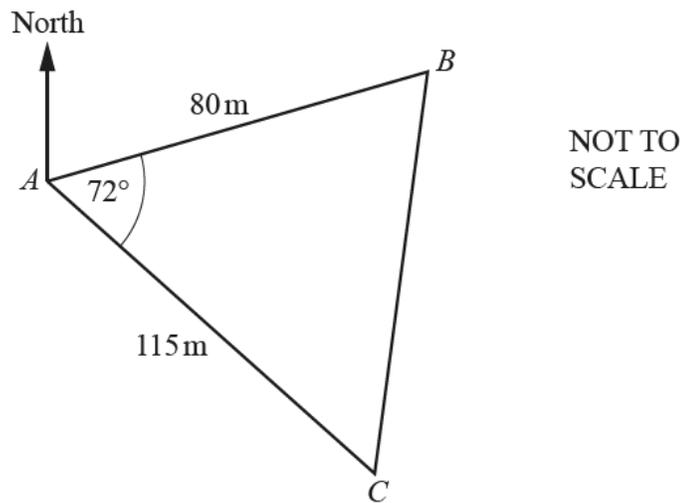
(a) Find the value of  $\cos x^\circ$ .

..... [2]

(b) Use your answer to **part (a)** to find the value of  $\cos(180-x)^\circ$ .

..... [1]





The diagram shows the positions of three points  $A$ ,  $B$ , and  $C$  in a field.

(a) Show that  $BC$  is 118.1 m, correct to 1 decimal place.

(b) Calculate angle  $ABC$ .

[3]

Angle  $ABC = \dots\dots\dots$  [3]

(c) The bearing of  $C$  from  $A$  is  $147^\circ$ .

Find the bearing of

(i)  $A$  from  $B$ ,

..... [3]

(ii)  $B$  from  $C$ .

..... [2]

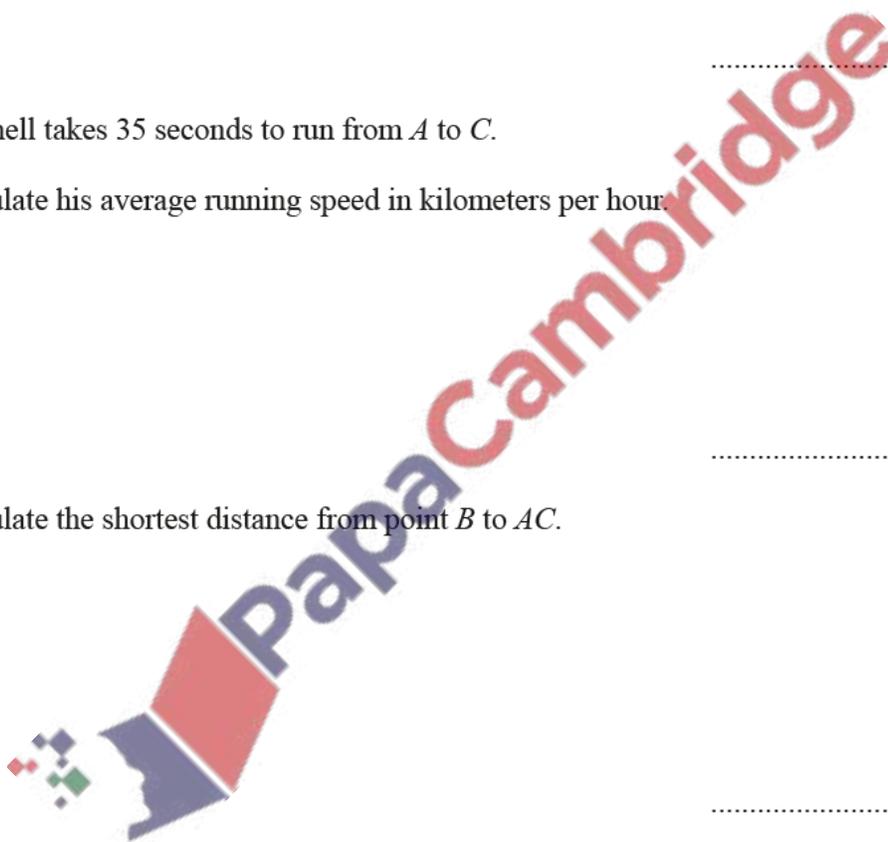
(d) Mitchell takes 35 seconds to run from  $A$  to  $C$ .

Calculate his average running speed in kilometers per hour.

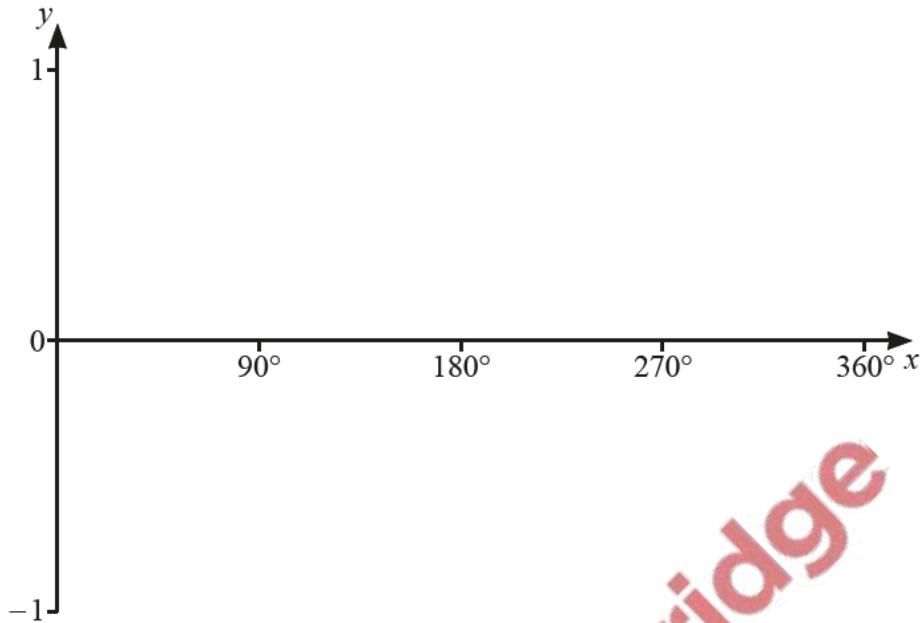
..... km/h [3]

(e) Calculate the shortest distance from point  $B$  to  $AC$ .

..... m [3]



(a) (i) On the axes, sketch the graph of  $y = \sin x$  for  $0^\circ \leq x \leq 360^\circ$ .



[2]

(ii) Describe fully the symmetry of the graph of  $y = \sin x$  for  $0^\circ \leq x \leq 360^\circ$ .

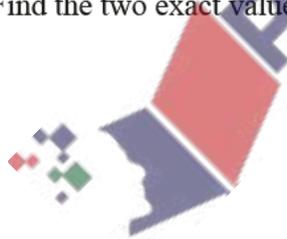
.....  
 .....

[2]

(iii) On the same diagram, sketch the line  $y = \frac{1}{2}$ .

[1]

(iv) Find the two exact values of  $x$  when  $\sin x = \frac{1}{2}$  for  $0^\circ \leq x \leq 360^\circ$ .



$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

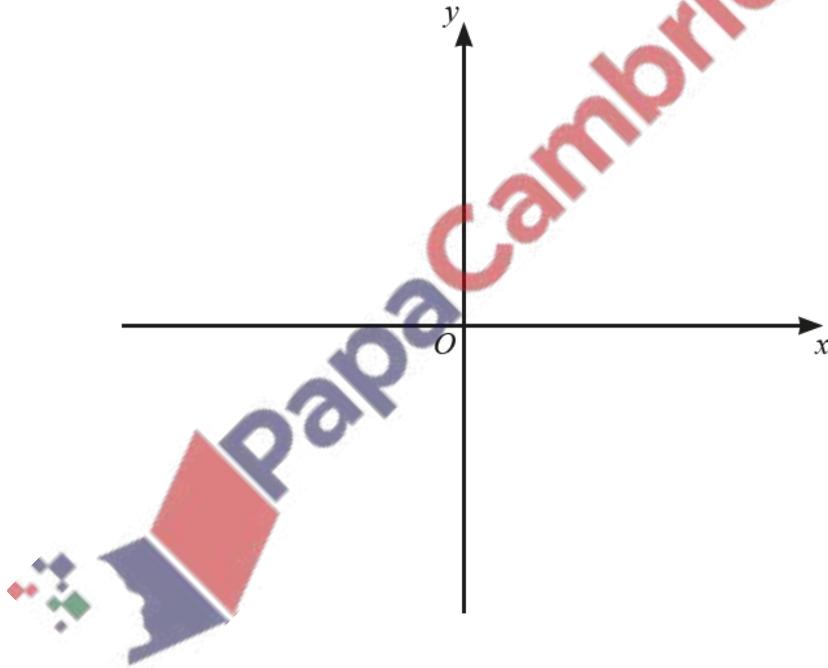
(b) (i) Write  $x^2 + 10x + 14$  in the form  $(x+a)^2 + b$ .

..... [2]

(ii) Write down the coordinates of the minimum point on the graph of  $y = x^2 + 10x + 14$ .

(....., .....) [2]

(iii) On the axes, sketch the graph of  $y = x^2 + 10x + 14$ .



[1]