

Total : / 45 marks

Question 1

[12 marks]

Complete the following table with the *exact values* of the missing trigonometric functions.

Assuming α is in région I (*acute angle*)

$\sin(\alpha)$	$\cos(\alpha)$	$\tan(\alpha)$
$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
$\frac{7}{25}$	$\frac{24}{25}$	$\frac{7}{23}$
$\frac{15}{17}$	$\frac{1}{\sqrt{1+(\frac{15}{8})^2}} = \frac{8}{17}$	$\frac{15}{8}$

Assuming β is in région III

$\sin(\beta)$	$\cos(\beta)$	$\tan(\beta)$
$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$
$-\frac{7}{25}$	$-\frac{24}{25}$	$\frac{7}{23}$
$-\frac{15}{17}$	$-\frac{8}{17}$	$\frac{15}{8}$

Question 2

[12 marks]

Complete the following table with approximate values

(using your calculator and the *inverse trigonometric functions*)

α°	α rad	$\sin(\alpha)$	$\cos(\alpha)$	$\tan(\alpha)$
60	1.047	0.866	0.5	1.732
16.27	0.284	0.28	0.96	0.292
61.93	1.08	0.88	0.471	1.875

Question 3

[12 marks]

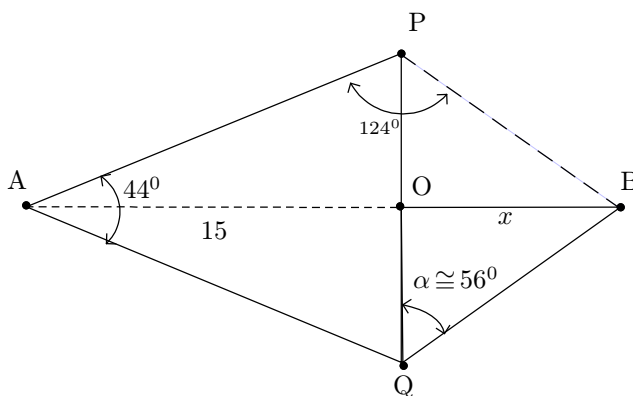
P and Q are placed on a circle of center O, and $\widehat{POQ}=180^\circ$.

A is at 15cm of O, and $\widehat{AOQ}=90^\circ$, $\widehat{QAP}=44^\circ$

B is at x cm of O and $\widehat{AOB}=180^\circ$

i) $x = 9\text{cm}$, $\alpha = \widehat{BQO}$, then $\tan(\alpha) = \frac{x}{r} \Rightarrow \alpha = \arctan\left(\frac{9}{15 \tan(22)}\right) \cong 56^\circ$.

ii) Angle $\widehat{APB} = (90 - 22)^\circ + \alpha \cong 124^\circ$.



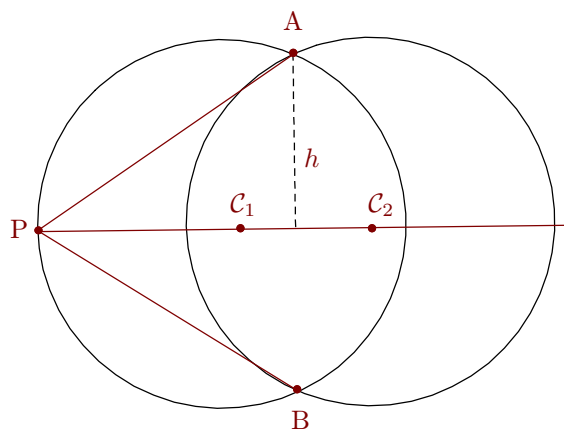
Question 4

[9 marks]

Given that :

- Two circles of center C_1 and C_2 have same radius $r = 4$ cm.
- The distance between the centers is : $d(C_1, C_2) = 3\text{cm}$
- A and B are the intersections of the two circles.
- P is in the intersection of the first circle and the line by C_1, C_2 .

i) Angle $\widehat{APB} = 2\widehat{APC_1} = 2 \arctan\left(\frac{h}{r + \frac{d}{2}}\right)$
 which $h = \sqrt{r^2 - \left(\frac{d}{2}\right)^2}$
 that gives $\widehat{APB} = 2 \arctan\left(\frac{\sqrt{16 - \frac{9}{4}}}{4 + \frac{3}{2}}\right)$
 $= 2 \arctan\left(\frac{\sqrt{55}}{11}\right) = \boxed{67.96^\circ}$



ii) (Bonus) Find the area of triangle PAB.

[+3]