Sec 4 Maths D: Topic 32

Date: 12/8/02 No. 8

1a $\angle ACD = 44°$ ($\angle$ in the same seg.)

b $\angle ADB = 180° - 62° - 38° - 44°$ ($\angle$ sum of Δ)

$= 36°$

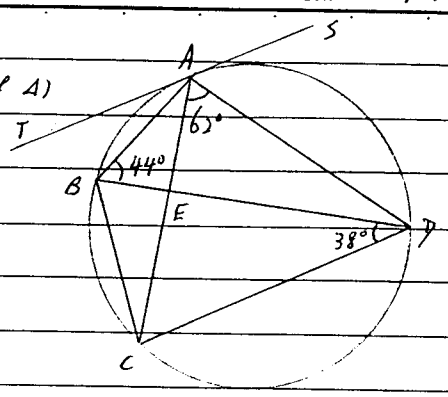
$\angle BCA = 36°$ ($\angle$ in the same seg.)

$\therefore \angle TAB = \angle BCA$ ($\angle$ in alt seg.)

$= 36°$

c. $\angle AEP = 180° - 62° - 36°$ ($\angle$ sum of Δ)

$= 82°$



2a $\angle PAB = 34°$ (CT // AB)

b $\angle OAT = 90°$ (rad. $\perp$ tangent)

$\angle AOT = 90° - 34°$ ($\angle$ sum of Δ)

$= 56°$

$\therefore \angle ABD = \frac{56°}{2}$ ($\angle$ at centre = twice $\angle$ at circ.)

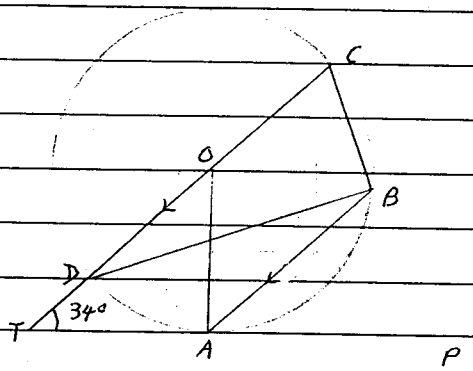
$= 28°$

c $\angle CDB = 28°$ (alt. $\angle$)

$\angle CBD = 90°$ ($\angle$ in a semi-circle)

$\therefore \angle BCD = 180° - 90° - 28°$ ($\angle$ sum of Δ)

$= 62°$



3a $\angle ADC = 162° \div 2$ ($\angle$ at centre = twice $\angle$ at circ.)

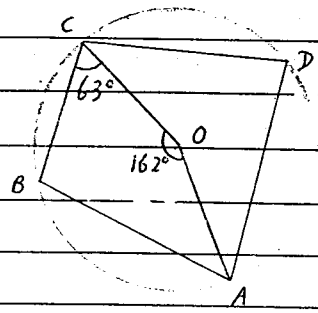
$= 81°$

$\therefore \angle ABC = 180° - 81°$ ($\angle$ in a cyclic quad.)

$= 99°$

b $\angle BAO = 360° - 162° - 63° - 99°$ ($\angle$ sum of quad)

$= 36°$



4a $\angle PQB = \frac{8x}{2} = 4x°$ ($\angle$ at centre = twice $\angle$ at circ.)

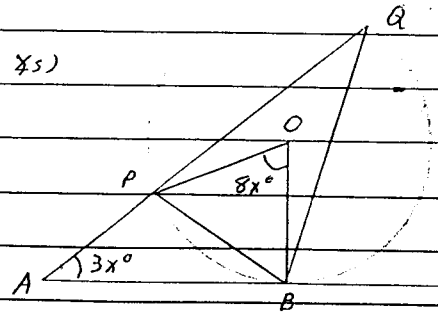
$\angle PBA = \angle PQB = 4x°$ ($\angle$ in alt. seg.)

b. $\angle QBC = 3x° + 4x°$ (ext $\angle$ = sum of 2 int. $\angle$s)

$= 7x°$

c. $\angle OBC = 90°$ (rad. $\perp$ tangent)

$\therefore \angle OBQ = 90° - 7x°$



5a $\angle BOC = 2 \times 28°$ ($\angle$ at centre = twice $\angle$ at circ.)

$= 56°$

b. $\angle OBT = 90°$ (rad. $\perp$ tangent)

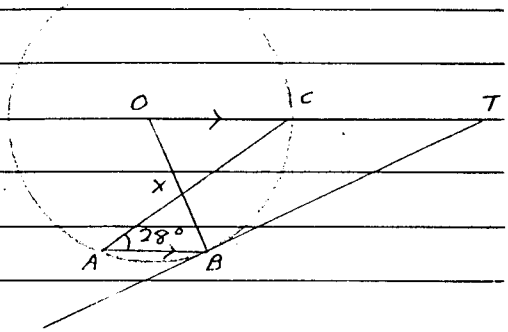
$\therefore \angle OTB = 90° - 58°$ ($\angle$ sum of Δ)

$= 34°$

c. $\angle OCX = 28°$ (alt $\angle$)

$\therefore \angle AXO = 28° + 56°$ (ext. $\angle$ = sum of 2 int. $\angle$s)

$= 84°$



6a $\angle OTA = 90°$ (rad. $\perp$ tangent)

$\therefore \angle OBA = 360° - 72° - 38° - 90°$ ($\angle$ sum of a quad)

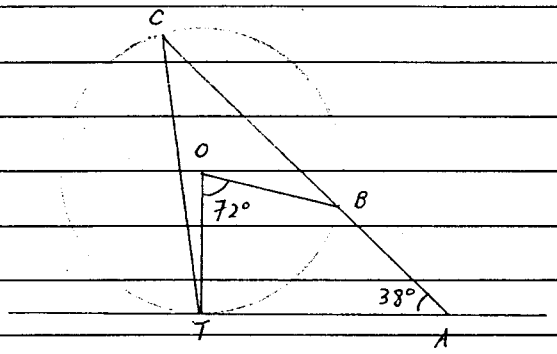
$= 160°$

b. $\angle BCT = \frac{72°}{2}$ ($\angle$ at centre = twice $\angle$ at circ.)

$= 36°$

c. $\angle OTC = 180° - 38° - 36° - 90°$ ($\angle$ sum of Δ)

$= 16°$



7i $\angle OAP = 90°$ (rad. $\perp$ tangent)

$\angle OAD = 90° - 28°$

$= 62°$

$\angle COA = 180° - 62°$ ($CO \parallel DA$)

$= 118°$

$\therefore \angle ABC = \frac{118°}{2}$ ($\angle$ at centre = twice $\angle$ at circ.)

$= 59°$

ii $\angle OAC = (180° - 118°) \div 2$ (ΔOAC is isos Δ)

$= 31°$

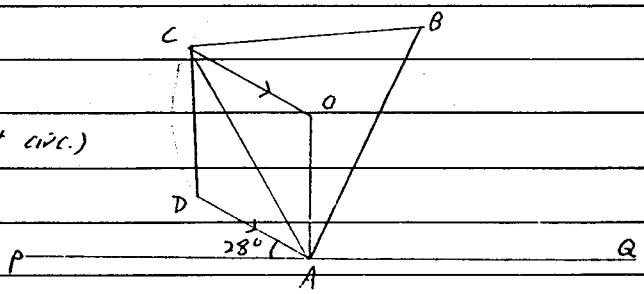
iii $\angle DCA = 28°$ ($\angle$ in alt seg.)

$\therefore \angle OCD = 31° + 28°$

$= 59°$

$AC^2 = 12^2 + 12^2 - 2(12)(12) \cos 118°$

$AC = 20.6$ cm (3 s.f.)



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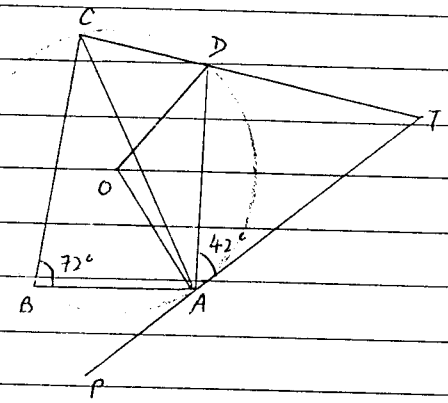
8a $\angle OAT = 90°$ ∵ OA is the radius to the tangent PAT at A.
Radius is ⊥ tangent.

b $\triangle OAD$ is isosceles.

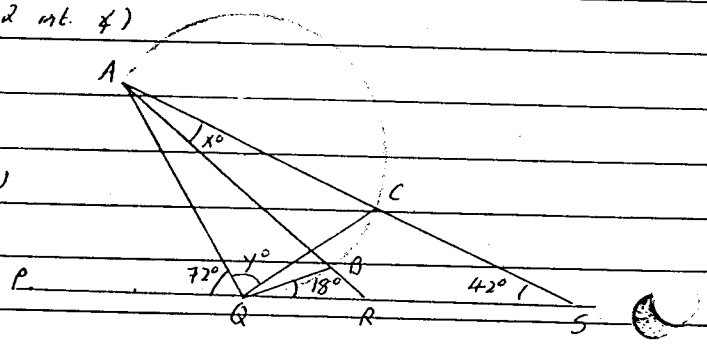
c. (i) $\angle ACD = 42°$ ($\angle$ in alt. seg.)
$\therefore \angle AOD = 2 \times 42°$ ($\angle$ at centre = twice $\angle$ at circ.)
$= 84°$

(ii) $\angle ODA = (180° - 84°) \div 2$ ($\triangle OAD$ is $\triangle$)
$= 48°$
$\angle ADC = 180° - 72°$ ($\angle$ of a cyclic quad.)
$= 108°$
$\therefore \angle ODC = 108° - 48°$
$= 60°$

(iii) $\angle ATD = 108° - 42°$ (ext. $\angle$ = sum of 2 int. $\angle$s)
$= 62°$



9 $\angle QAR = 18°$ ($\angle$ in alt. seg.)
$72° = 42° + x° + 18°$ (ext. $\angle$ = sum of 2 int. $\angle$)
$x = 12$
$\angle CQB = x° = 12°$ ($\angle$ in the same seg.)
$\therefore y = 180 - 72 - 18 - 12$ ($\angle$ on a str. line)
$= 78°$



10i $\angle SPQ = 180° - 134°$ ($\angle$ on a str. line)
$= 46°$
$\therefore \angle QRS = 180° - 46°$ ($\angle$ in a cyclic quad)
$= 134°$

ii $\angle RSQ = (180° - 134°) \div 2$ ($\triangle SRQ$ is $\triangle$)
$= 23°$
$\angle PSQ = 90°$ ($\angle$ in a semi-circle)
$\therefore \angle PSR = 90° + 23°$
$= 113°$