

Name Mrs. Dounias

Key

Date

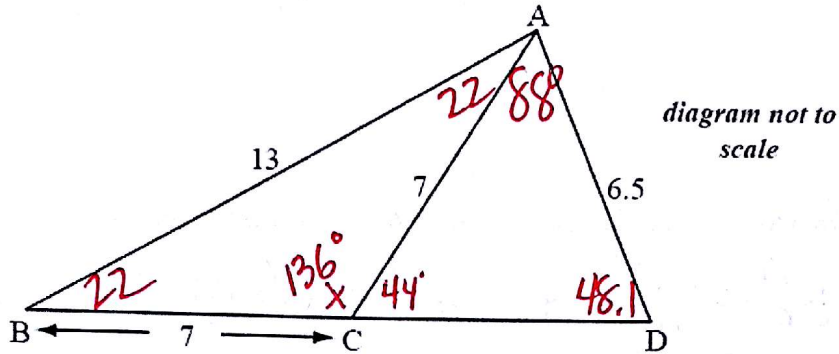
REVIEW SHEET FOR Trig Applications Test #3 Q2

*Counts 50 pts of Test 3.

1.

[Maximum mark: 8]

The diagram below shows a triangle ABD with AB = 13 cm and AD = 6.5 cm. Let C be a point on the line BD such that BC = AC = 7 cm.



(a) Find the size of angle ACB.

$$13^2 = 7^2 + 7^2 - 2(7)(7)\cos X$$

[3 marks]

(b) Find the size of angle CAD.

$$\frac{71}{-98} = \frac{-98\cos X}{-98}$$

[5 marks]

$$-.724 = \cos X$$

$$\frac{\sin 44}{6.5} = \frac{\sin D}{7}$$

$$.75 = \sin D$$

$$D = 48.4$$

$$\angle CAD = 88^\circ \text{ or } 40^\circ$$

2. Solve for all values of $0 \leq x \leq 3\pi$

$\frac{18\pi}{6}$

$$2\sin(x + \frac{\pi}{2}) - \sqrt{3} = 0$$

(8 pts)

$$\text{let } u = x + \frac{\pi}{2}$$

$$\sin u = \frac{\sqrt{3}}{2}$$

$$u = \frac{\pi}{3} + 2\pi k$$

$$x + \frac{\pi}{2} = \frac{\pi}{3} + 2\pi k$$

$$x = \frac{2\pi}{6} - \frac{3\pi}{6} + 2\pi k$$

$$-\frac{\pi}{6}$$

$$u = \frac{2\pi}{3} + 2\pi k$$

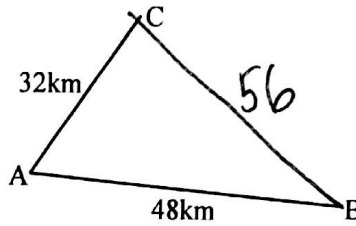
$$x + \frac{\pi}{2} = \frac{2\pi}{3} + 2\pi k$$

$$\frac{4\pi}{6} - \frac{3\pi}{6}$$

$$\frac{\pi}{6} + 2\pi k$$

$$x = \frac{\pi}{6}, \frac{11\pi}{6}, \frac{13\pi}{6}$$

4. Town A is 48 km from town B and 32 km from town C as shown in the diagram.



Given that town B is 56 km from town C, find the size of angle $\hat{C}AB$ to the nearest degree.

(4 pts)

$$56^2 = 32^2 + 48^2 - 2(32)(48)\cos A$$

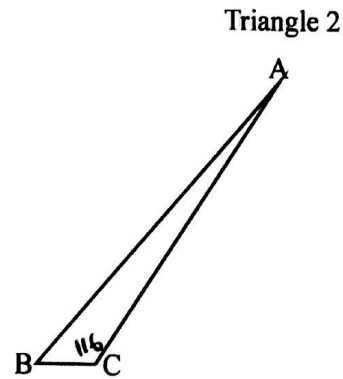
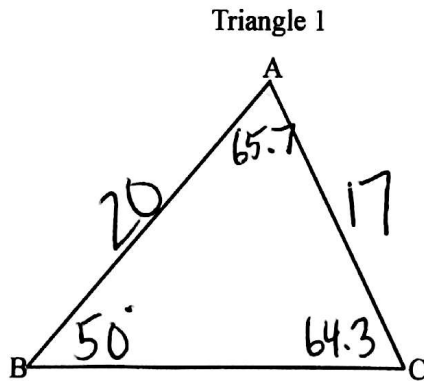
$$\frac{56^2 - 32^2 - 48^2}{(-64)(48)} = \cos A$$

$$A = 86.4^\circ$$

5. The diagrams below show two triangles both satisfying the conditions

$$AB = 20 \text{ cm}, AC = 17 \text{ cm}, \hat{A}BC = 50^\circ.$$

Diagrams not to scale



- (a) Calculate the size of $\hat{A}CB$ in Triangle 2.

$$116^\circ$$

$$\frac{\sin 50}{17} = \frac{\sin C}{20} \quad \sin C = .901228$$

- (b) Calculate the area of Triangle 1.

"SAS"

$$180 - (50 + 64.3)$$

$$C = 64.3, 116^\circ$$

(5 marks)

$$A_1 = \frac{1}{2}(20)(17)\sin 65.7 = 154.9 = \boxed{155}$$

6. The points P, Q, R are three markers on level ground, joined by straight paths PQ, QR, PR as shown in the diagram. QR = 9 km, $\hat{PQR} = 35^\circ$, $\hat{PRQ} = 25^\circ$.

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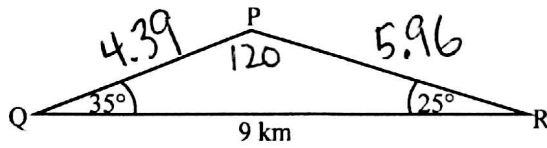


Diagram not to scale

- (a) Find the length PR.

$$\frac{\sin 120}{9} = \frac{\sin 35}{PR}$$

$$180 - (35 + 25) = 120$$

$$PR = \frac{9 \sin 35}{\sin 120} = 5.96 = PR$$

(3)

- * (b) Tom sets out to walk from Q to P at a steady speed of 8 km h^{-1} . At the same time, Alan sets out to jog from R to P at a steady speed of $a \text{ km h}^{-1}$. They reach P at the same time. Calculate the value of a .

① find QP

$$\frac{\sin 120}{9} = \frac{\sin 25}{QP}$$

$$QP = 4.39$$

$$D = rt$$

$$t = \frac{D}{r}$$

$$t = \frac{4.39}{8} = 0.5489 \text{ hr.}$$

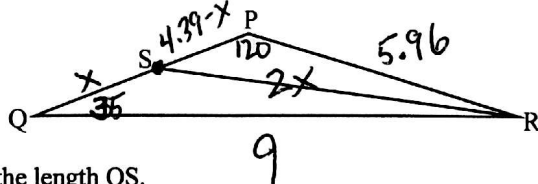
$$t = \frac{D}{r}$$

$$0.5489 = \frac{5.96}{a}$$

$$a = 10.85$$

(7)

- * (c) The point S is on [PQ], such that $RS = 2QS$, as shown in the diagram.



Find the length QS.

$$(2x)^2 = (4.39 - x)^2 + 5.96^2 - 2(4.39 - x)(5.96) \cos 120$$

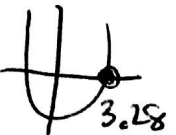
$$4x^2 = (4.39 - x)(4.39 - x) + 35.5 + 5.96(4.39 - x)$$

$$4x^2 = 19.27 - 8.78x + x^2 + 35.5 + 26.2 - 5.96x$$

(Total 16 marks) (6)

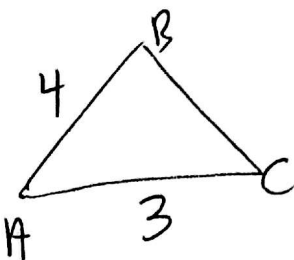
$$3x^2 + 14.74x - 80.9 = 0 \quad \leftarrow \text{Use Calc.}$$

$$QS = 3.28$$



7. In a triangle ABC, AB = 4 cm, AC = 3 cm and the area of the triangle is 4.5 cm^2 .

Find the two possible values of the angle \hat{BAC} .



$$A_{\Delta} = 4.5 = \frac{1}{2}(4)(3) \sin A$$

$$\frac{4.5}{6} = \sin A$$

$$.75 = \sin A$$

$$A = 48.6^\circ$$

$$131^\circ$$