
UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2007/2008

April 2008

MGM 531 – Euclidean Geometry
[Geometri Euclidean]

Duration : 3 hours
[Masa : 3 jam]

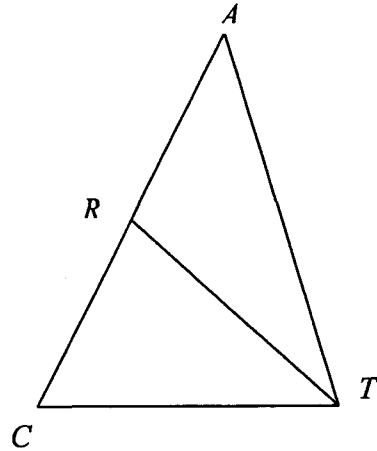
Please check that this examination paper consists of SEVEN pages of printed material before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi TUJUH muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instructions: Answer all nine [9] questions.

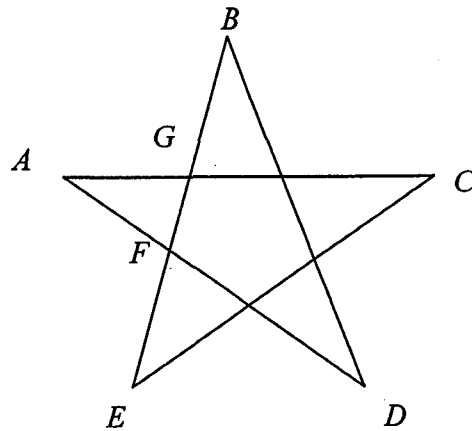
[Arahan: Jawab semua sembilan [9] soalan.]

1. Given $\triangle CAT$ such that $\angle ACT = \angle ATC$ and $\angle CAT = 26^\circ$. If TR bisects $\angle ATC$, then find $\angle CRT$.



[3 marks]

2. In the figure below, if $\angle FAG = 20^\circ$ and $\angle AFG = \angle AGF$, then find $\angle DBF + \angle BDF$.

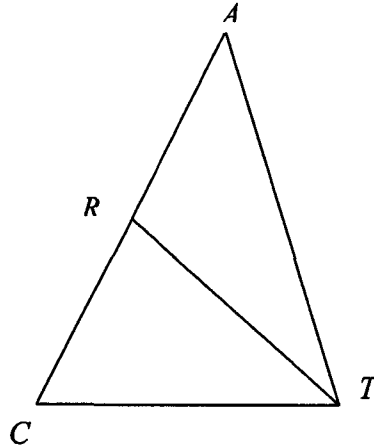


[3 marks]

3. If the base and the area of a triangle are fixed, show that the perimeter of the triangle will be minimal if it is isosceles.

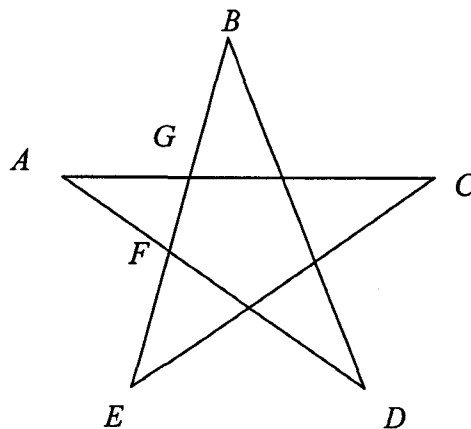
[5 marks]

1. Diberi $\triangle CAT$ sedemikian $\angle ACT = \angle ATC$ and $\angle CAT = 26^\circ$. Jika TR membahagi dua tepat $\angle ATC$, cari $\angle CRT$.



[3 markah]

2. Pada gambarajah di bawah, jika $\angle FAG = 20^\circ$ dan $\angle AFG = \angle AGF$, cari $\angle DBF + \angle BDF$.

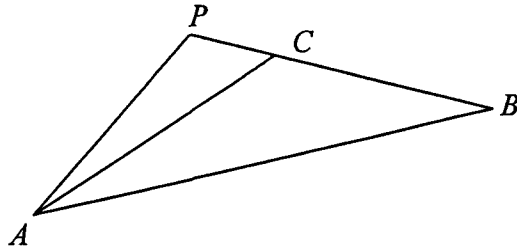


[3 markah]

3. Jika tapak dan luas suatu segitiga adalah tetap, tunjukkan perimeter segitiga akan menjadi terkecil jika ia adalah segitiga dua sisi sama.

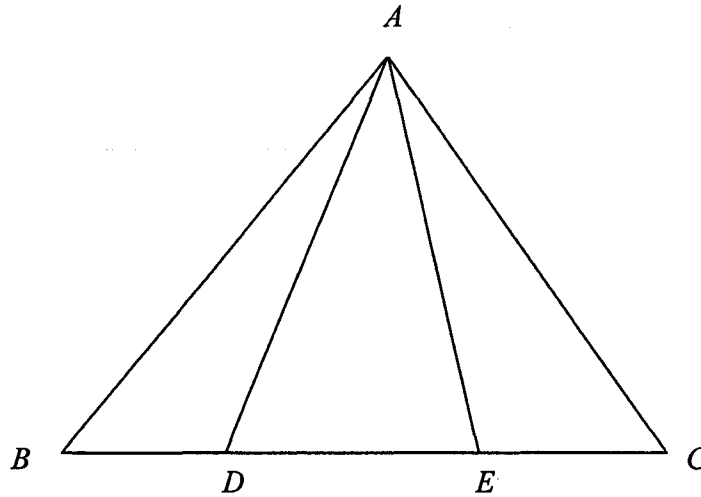
[5 markah]

4. In the figure $AB = 8$, $BC = 7$ and $CA = 6$. $\triangle PAB$ is similar to $\triangle PCA$. Find PC .



[9 marks]

5. In $\triangle ABC$, $BC = 29$, $CA = 21$, and $AB = 20$. The points D, E lie on the segment BC with $BD = 8$, $DE = 12$, and $EC = 9$. Find $\angle DAE$.

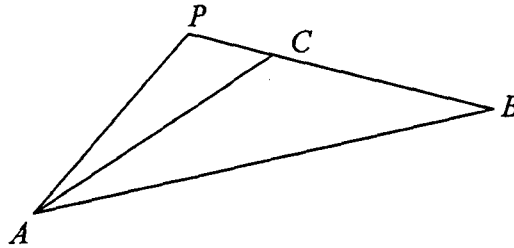


[10 marks]

6. If squares with centers O_1, O_2, O_3 are erected externally on the sides BC, CA, AB of $\triangle ABC$, show that
- $O_2O_3 = AO_1$.
 - the line segments O_2O_3 and AO_1 are perpendicular.

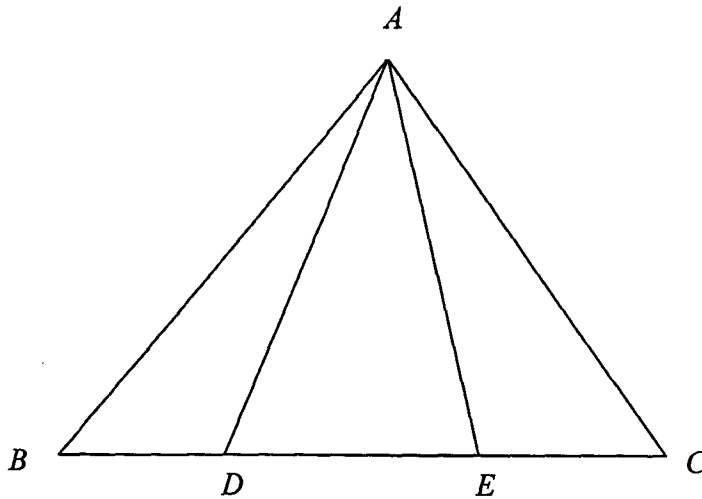
[15 marks]

4. Pada gambarajah $AB = 8$, $BC = 7$ dan $CA = 6$. ΔPAB adalah serupa dengan ΔPCA . Cari PC .



[9 markah]

5. Pada ΔABC , $BC = 29$, $CA = 21$, dan $AB = 20$. Titik D , titik E berada pada segmen BC dengan $BD = 8$, $DE = 12$, dan $EC = 9$. Cari $\angle DAE$.



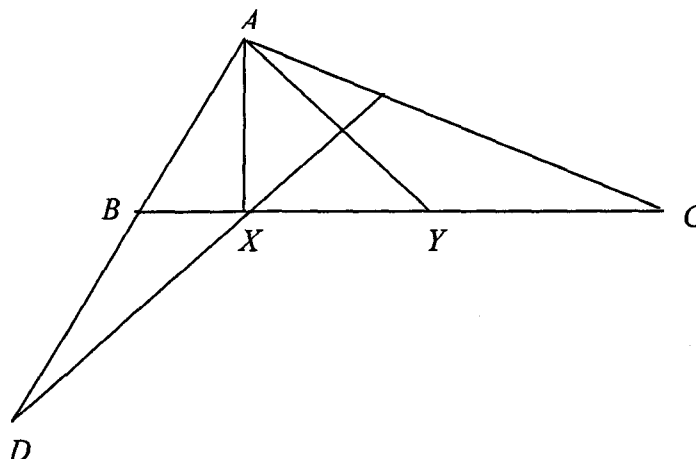
[10 markah]

6. Jika segiempat sama dengan pusat O_1, O_2, O_3 dibina secara luaran pada sisi sisi BC, CA, AB ΔABC , tunjukkan bahawa

- (a) $O_2O_3 = AO_1$.
 (b) garis segmen O_2O_3 dan AO_1 adalah berserenjang.

[15 markah]

7. In $\triangle ABC$, $\angle CAB = 90^\circ$. X is the foot of the perpendicular from A , and D is the reflection of A with respect to the point B . Y is the midpoint of XC .



Show that

- $\angle DAX = \angle ACY$.
- $\frac{DA}{XA} = \frac{AC}{YC}$.
- DX is perpendicular to AY .

[15 marks]

8. In the cyclic quadrilateral $ABCD$, the diagonal AC bisects the angle $\angle DAB$. The side AD is extended beyond D to a point E . Show that

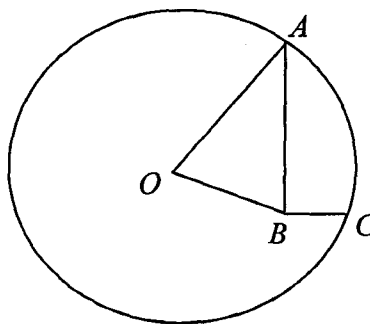
- if $CE = CA$ then $DE = AB$.
- if $DE = AB$ then $CE = CA$.

[20 marks]

9. Let A and C lie on a circle center O with radius $\sqrt{50}$. The point B is inside the circle such that

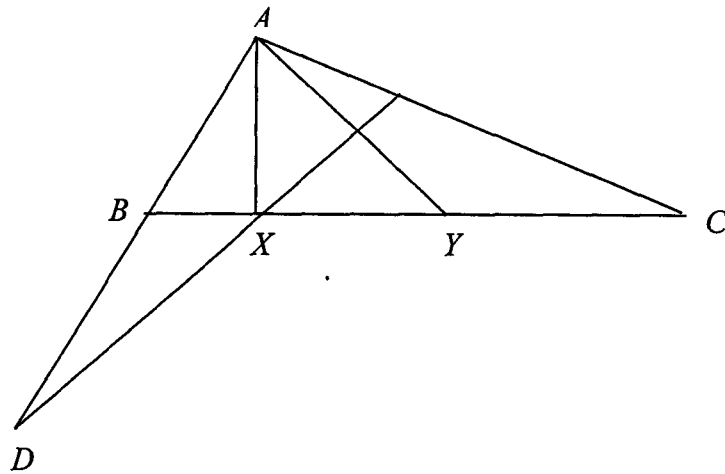
$$\angle ABC = 90^\circ, AB = 6, BC = 2.$$

- Show that $\angle OAB = 45^\circ$.
- Find OB .



[20 marks]

7. Pada $\triangle ABC$, $\angle CAB = 90^\circ$. X adalah tapak berserenjang dari A , dan D adalah pantulan A terhadap titik B . Jika Y adalah titik tengah XC ,



Tunjukkan bahawa

- (a) $\angle DAX = \angle ACY$.
 (b) $\frac{DA}{XA} = \frac{AC}{YC}$.
 (c) DX adalah berserenjang pada AY .

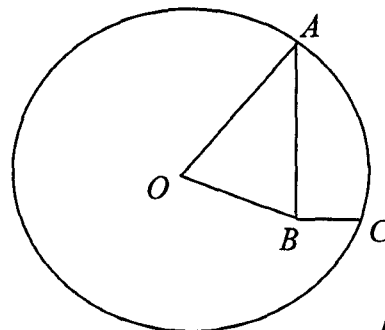
[15 markah]

8. Pada segiempat kitaran $ABCD$, pepenjuru AC membahagi dua sama sudut $\angle DAB$. Sisi AD diperpanjangkan melepasi D ke suatu titik E . Tunjukkan
- (a) jika $CE = CA$ maka $DE = AB$.
 (b) jika $DE = AB$ maka $CE = CA$.

[20 markah]

9. Biar A dan C berada pada suatu bulatan berpusat pada O dengan jejari $\sqrt{50}$. Titik B adalah di dalam bulatan sedemikian $\angle ABC = 90^\circ$, $AB = 6$, $BC = 2$.

- (a) Tunjukkan $\angle OAB = 45^\circ$.
 (b) Cari OB .



[20 markah]