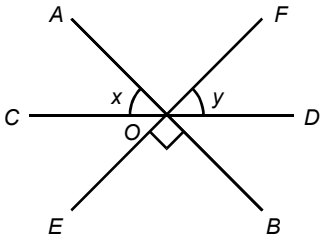
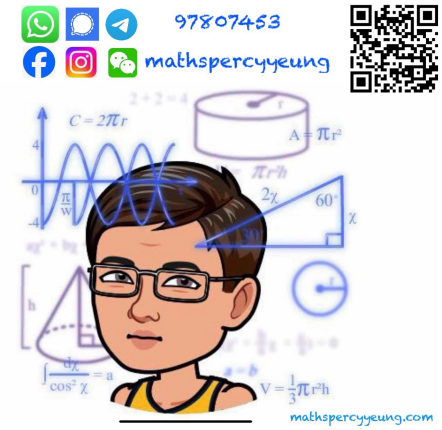
Chapter 5 Introduction to Deductive Geometry

Multiple Choice Section

1. In the figure, AOB, COD and EOF are straight lines, $\angle EOB = 90°$. Which of the following must be correct?





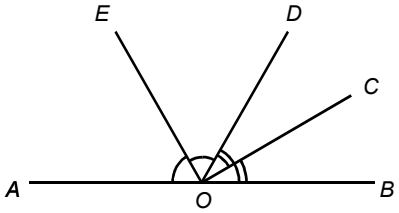
A. $x = y$

B. $x + y = 45°$

C. $x + y = 90°$

D. None of the above

2. In the figure, AOB is a straight line. OE and OC are the angle bisectors of $\angle AOD$ and $\angle BOD$ respectively. Which of the following must be a right angle?



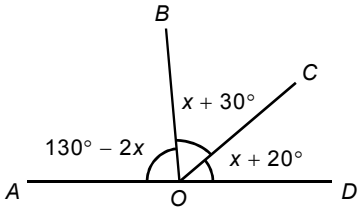
A. $\angle AOD$

B. $\angle EOC$

C. $\angle DOB$

D. None of the above

3. In the figure, which of the following must be correct?



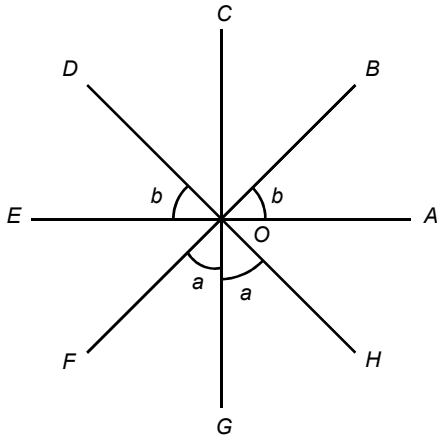
A. $x = 20°$

B. $\angle AOB = \angle BOD$

C. $\angle AOB$ is a right angle.

D. AOD is a straight line.

4. In the figure, AOE, BOF, COG and DOH are straight lines. Which of the following must be a right angle?



I. $\angle AOC$

II. $\angle BOH$

III. $\angle COE$

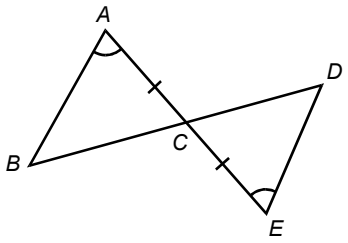
A. I and II only

B. II and III only

C. I and III only

D. I, II and III

5. In the figure, AE and BD intersect at C, $AC = EC$ and $\angle BAC = \angle DEC$. Which of the following must be correct?



A. $AB = CD$

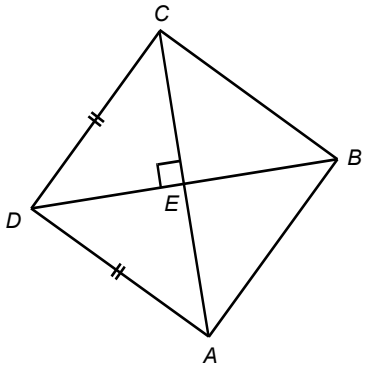
B. $CD = DE$

C. $DE = BC$

D. $BC = DC$

6. In the figure, CA and DB intersect at E, $CA \perp DB$ and $CD = AD$. Which of the following must be

correct?



I. $\angle CDE = \angle ADE$

II. $\angle DEA = \angle BEC$

III. BD bisects $\angle ABC$.

IV. AC bisects $\angle DCB$.

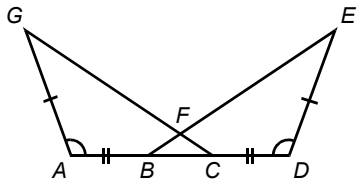
A. I and II only

B. II and III only

C. I, II and III only

D. I, II, III and IV

7. In the figure, $ABCD$, GFC and EFB are straight lines, $\angle GAC = \angle EDB$, $AB = DC$ and $AG = DE$. What type of triangle is ΔBCF?



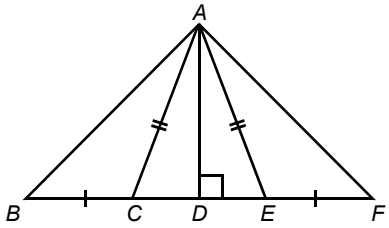
A. An isosceles triangle

B. An equilateral triangle

C. An irregular triangle

D. It cannot be determined.

8. In the figure, $BCDEF$ is a straight line, $BC = FE$, $AC = AE$ and $AD \perp BF$. Which of the following must be correct?



I. $\Delta ACD \cong \Delta AED$

II. $\Delta ACB \cong \Delta AEF$

III. $\Delta ADB \cong \Delta ADF$

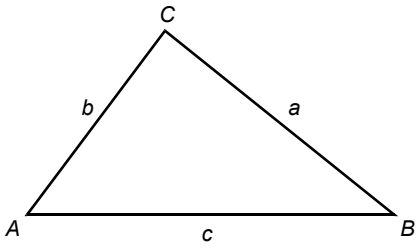
A. I only

B. II only

C. I and II only

D. I, II and III

9. The figure shows ΔABC. Which of the following must be correct?



I. $a^2 + b^2 = c^2$

II. The perimeter of ΔABC is less than $2(a + b)$.

III. The perimeter of ΔABC is greater than $2c$.

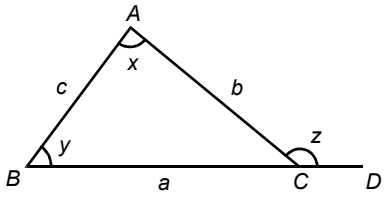
A. I only

B. II only

C. II and III only

D. I, II and III

10. In the figure, ABC is a triangle and BC is produced to D. Which of the following must be correct?



I. $z > x$

II. $a > b + c$

III. If $a > b$, then $x < y$.

A. I only

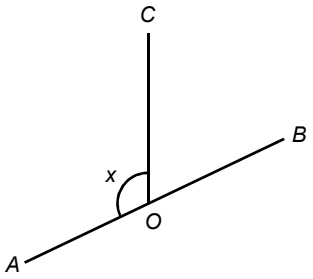
B. II only

C. I and II only

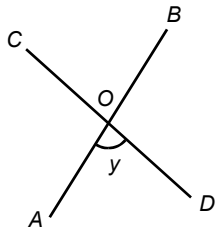
D. I, II and III

Section A(1)

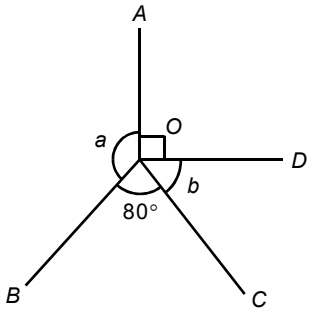
1. In the figure, AOB is a straight line. Express $\angle COB$ in terms of x.



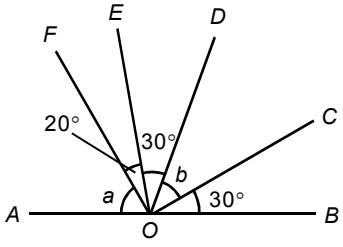
2. In the figure, AOB and COD are straight lines. Express $\angle COB$ in terms of y.



3. In the figure, $\angle AOD = 90°$ and $\angle BOC = 80°$. Prove that $a + b = 190°$.

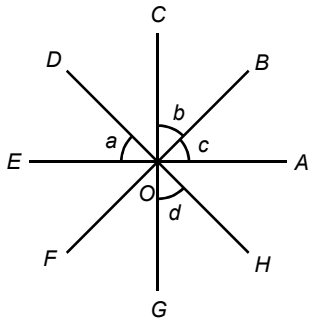


4. In the figure, AOB is a straight line. Prove that $a + b = 100°$.

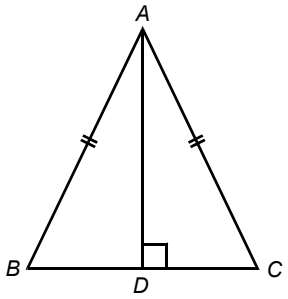


5. In the figure, AOE, BOF, COG and DOH are straight lines.

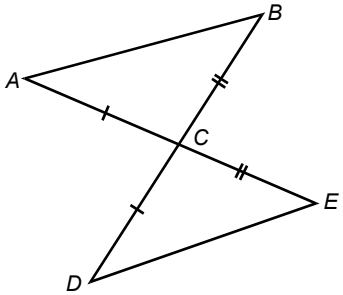
Prove that $a + b + c + d = 180°$.



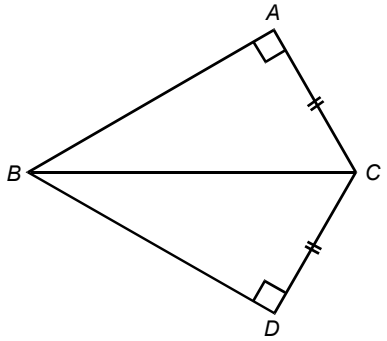
6. In the figure, BDC is a straight line and $AB = AC$. Prove that $\angle ABD = \angle ACD$.



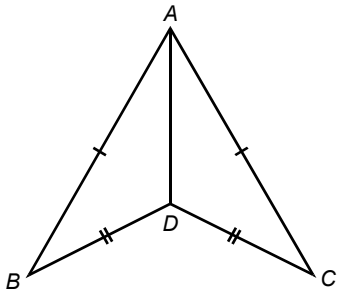
7. In the figure, AE and BD intersect at C, $AC = DC$ and $BC = EC$. Prove that $AB = DE$.



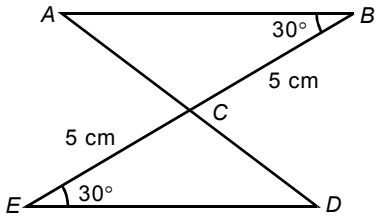
8. In the figure, $\angle BAC = \angle BDC = 90°$ and $AC = DC$. Prove that BC bisects $\angle ABD$.



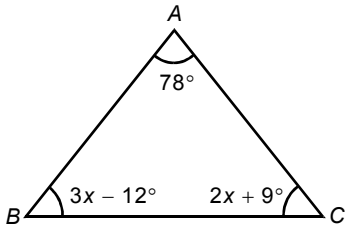
9. In the figure, $AB = AC$ and $BD = CD$. Prove that $\Delta ABD \cong \Delta ACD$.



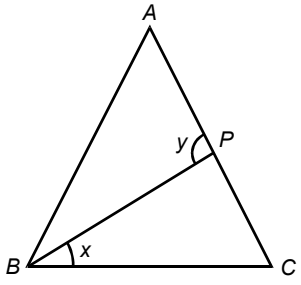
10. In the figure, ACD and BCE are straight lines, $\angle ABC = \angle CED = 30°$ and $BC = CE = 5$ cm. Prove that $AB = DE$.



11. In the figure, prove that ΔABC is an isosceles triangle.

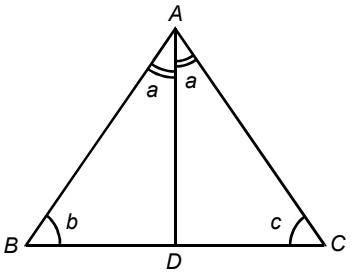


12. In the figure, $AB = AC$ and BP bisects $\angle ABC$. Prove that $y = 3x$.

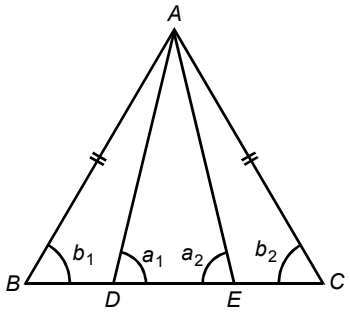


13. In the figure, BDC is a straight line. $\angle BAD = \angle CAD = a$ and $b = c$.

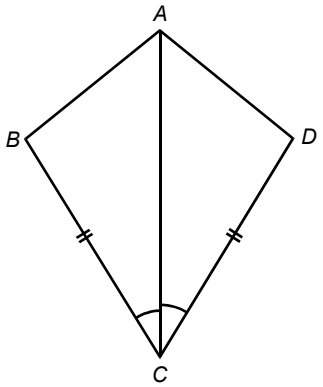
Prove that $AD \perp BC$.



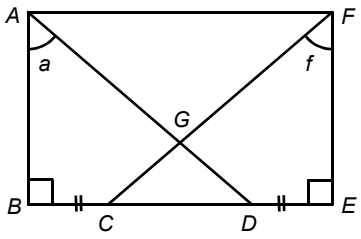
14. In the figure, $BDEC$ is a straight line. $AB = AC$ and $a_1 = a_2$. Prove that $BE = CD$.



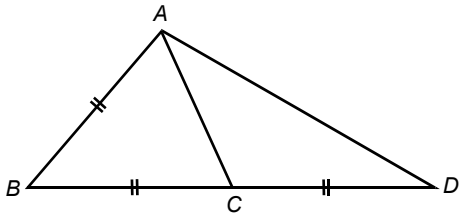
15. In the figure, AC bisects $\angle BCD$ and $BC = DC$. Prove that $\Delta BCA \cong \Delta DCA$.



16. In the figure, $BCDE$, AGD and FGC are straight lines. $\angle ABE = \angle FEB = 90°$, $a = f$ and $BC = ED$. Prove that $AD = FC$.



17. In ΔABD, C is the mid-point of BD and $AB = BC$. Prove that $3AB > AD$.

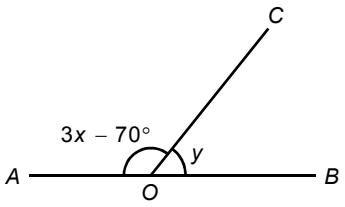


18. Construct a right-angled triangle with a as its hypotenuse and b as an adjacent side with proof.

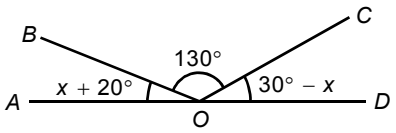
19. Construct a right-angled triangle with a and b as the adjacent sides with proof.

Section A(2)

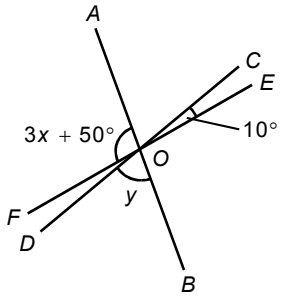
20. In the figure, AOB is a straight line. Express y in terms of x.



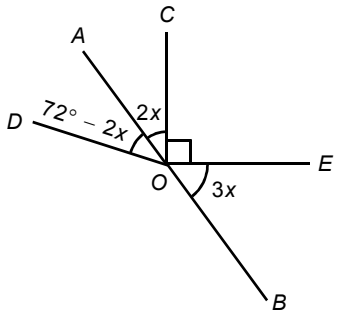
21. In the figure, prove that AOD is a straight line.



22. In the figure, AOB, COD and EOF are straight lines. Prove that $y = 120° - 3x$.



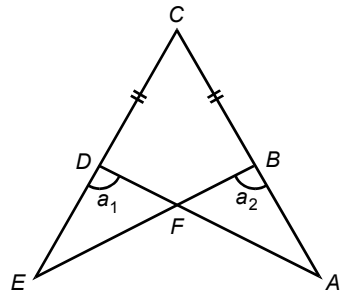
23. In the figure, $\angle AOD = \angle AOC$ and $\angle COE = 90°$.



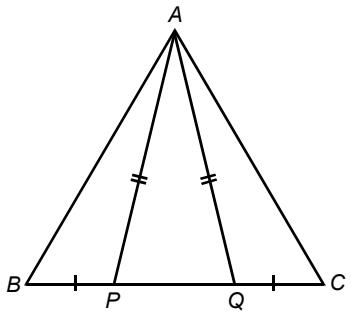
(a) Find x.

(b) Prove that AOB is a straight line.

24. In the figure, CDE, CBA, DFA and BFE are straight lines, $DC = BC$ and $a_1 = a_2$. Prove that $\Delta ADC \cong \Delta EBC$.



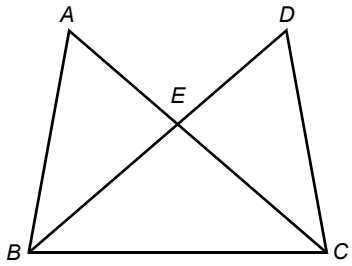
25. In the figure, $BPQC$ is a straight line, $BP = CQ$ and $AP = AQ$.



(a) Prove that $\angle APB = \angle AQC$.

(b) Prove that $\Delta APB \cong \Delta AQC$.

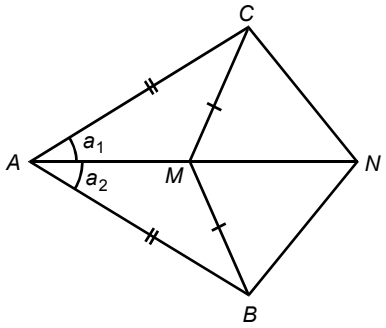
26. In the figure, AEC and DEB are straight lines, $AB = DC$ and $AC = DB$.



(a) Prove that $\Delta ABC \cong \Delta DCB$.

(b) Prove that ΔEBC is an isosceles triangle.

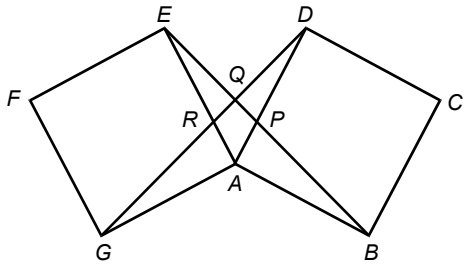
27. In the figure, AMN is a straight line, $AB = AC$ and $BM = CM$.



(a) Prove that $a_1 = a_2$.

(b) Prove that $CN = BN$.

28. In the figure, $ABCD$ and $AEFG$ are two identical squares. $EQPB$ and $DQRG$ are straight lines.

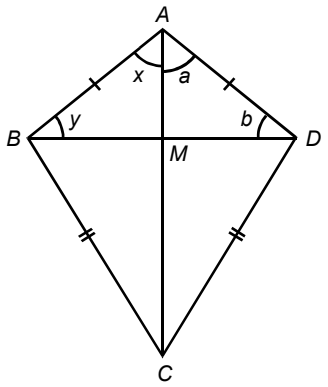


(a) Prove that $\Delta EAB \cong \Delta DAG$.

(b) Prove that $EB = DG$.

Section B

29. In the figure, $ABCD$ is a quadrilateral. The diagonals AC and BD intersect at M. $AB = AD$ and $BC = DC$.



(a) Prove that $x = a$.

(b) Prove that $x + y = 90°$.