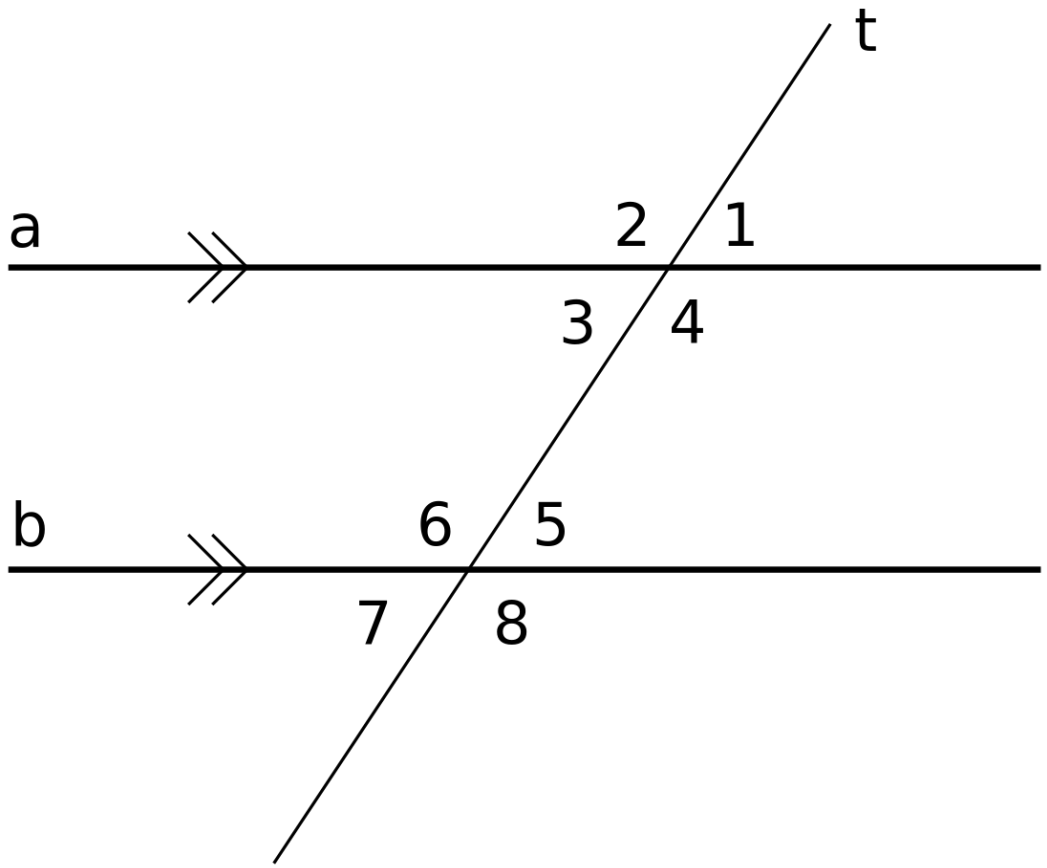
GEOMETRY

Part 1- Angles & Plane figures

TYPES OF ANGLES

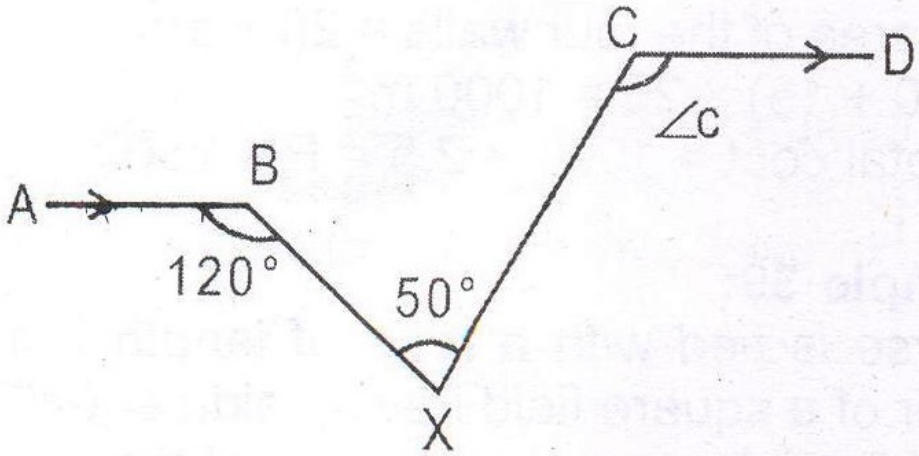
- Line, Parallel lines, Intersecting lines, Transversal
- Right Angle
- Acute Angle
- Obtuse Angle
- Reflex Angle
- Complementary Angles
- Supplementary Angles
- Vertically Opposite Angles

ANGLES IN PARALLEL LINES



PROBLEM 1

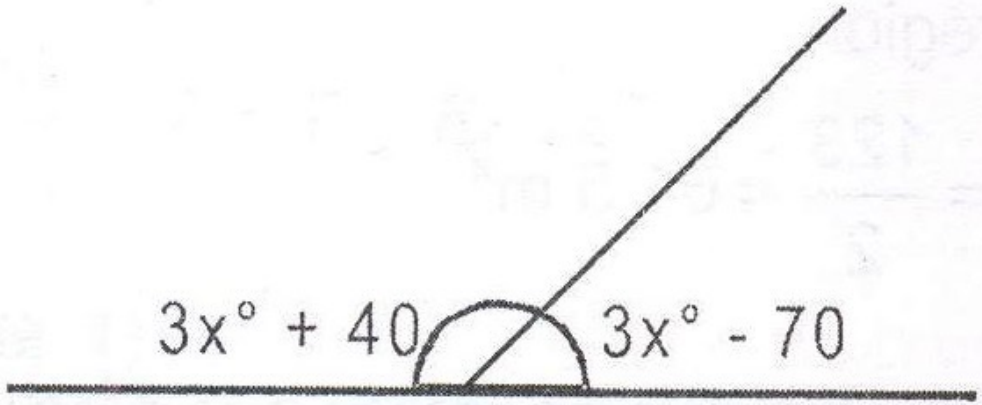
In the adjoining figure, find the measure of ∠c.



(1) 110° ✓
(2) 70°
(3) 80°
(4) 90°

PROBLEM 2

Find the value of x°.

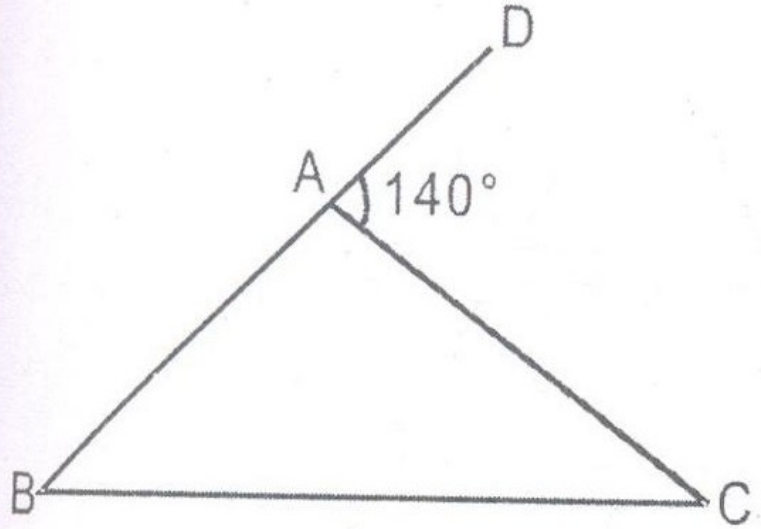


(1) 45°
(2) 40°
(3) 35° ✓
(4) 50°

PROBLEM 3

In the following diagram $\angle B : \angle C = 3 : 4$.

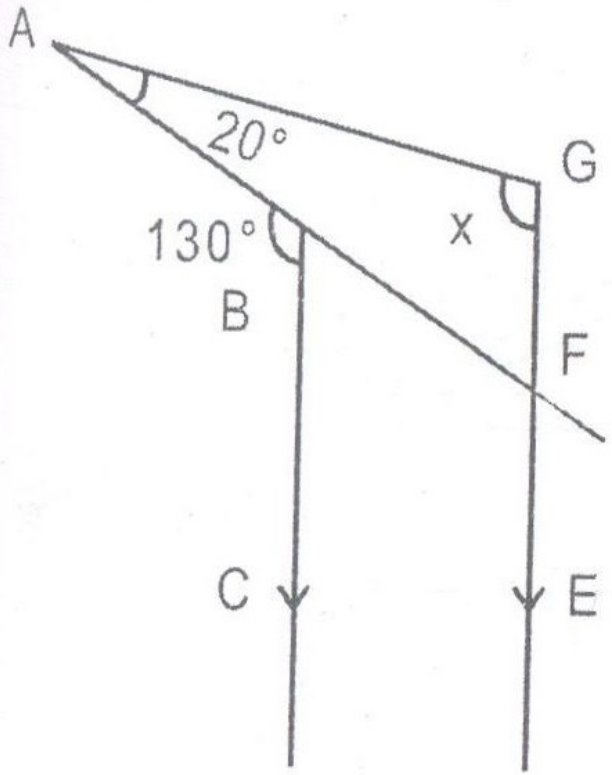
Find the measure of $\angle B$.



(1) 90°
(2) 100°
(3) 80°
(4) 60° ✓

PROBLEM 4

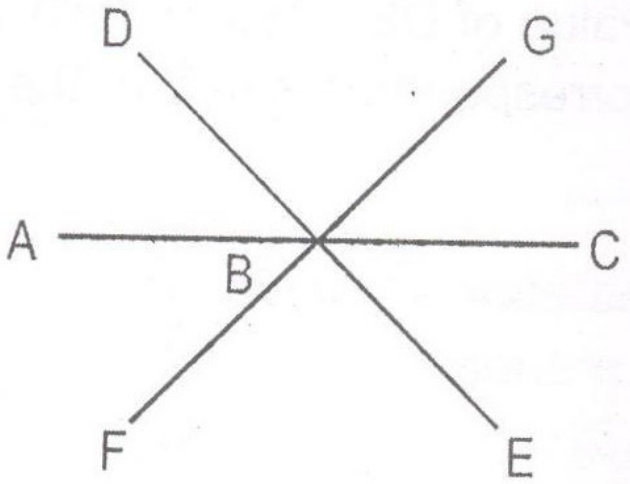
Find the value of x in the following figure.



(1) 70°
(2) 80°
(3) 110° ✓
(4) 120°

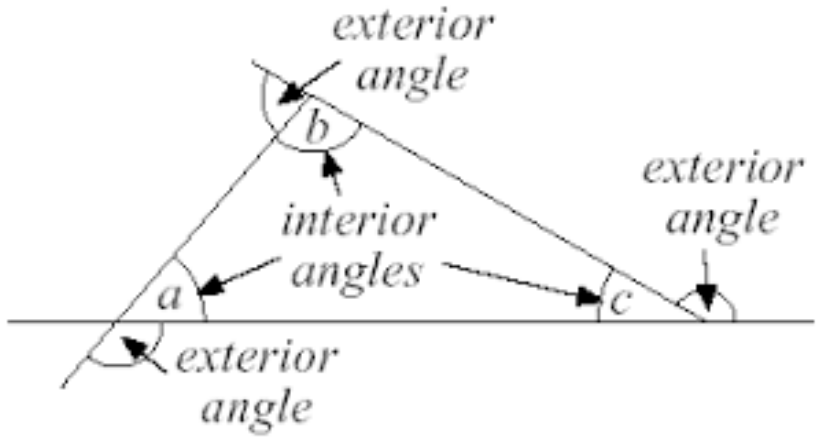
PROBLEM 5

In the given figure, if ∠DBG is equal to 55° and ∠CBF is equal to 115°, then find the measure of ∠GBE.



(1) 70°
(2) 125° ✓
(3) 80°
(4) 30°

TRIANGLE PROPERTIES



1. The sum of three interior angles of a triangle is 180.

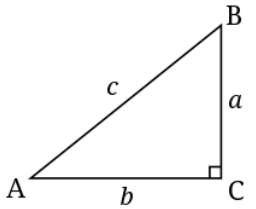
2. The exterior angle of a triangle is equal to sum of the two interior opposite angles.

3. The sum of two sides of a triangle is always greater than the third
i.e., AB + BC > AC and the difference between the two sides is less than the third, AB – BC < AC.

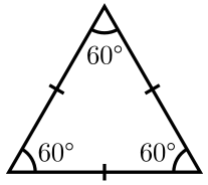
4. The side opposite of the biggest angle is the longest side and vice versa.

AREA OF TRIANGLE

1. Area of a Triangle, A = 1/2×bh.



2. Area of an Equilateral Triangle = A = (√3)/4×a^2.



3. Area of Triangle with Three Sides (Heron's Formula)

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

Area	= area
s	= semi-perimeter
a	= length of side a
b	= length of side b
c	= length of side c

4. Triangle area for Two Sides and the Included Angle = ½ bc sin A.

5. Area = r × S, r is inradius.
6. Area of Triangle = abc/4R, where R is circumradius.

AREA OF TRIANGLE

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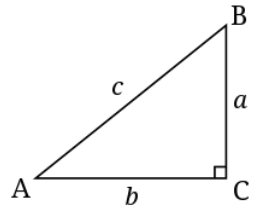
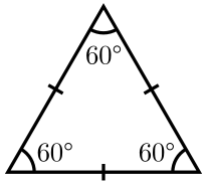


2. Area of an Equilateral Triangle, A = $\frac{\sqrt{3}}{4}a^2$



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SIMILAR AND CONGRUENT

Similar Triangles

Same shape but different in size.

Congruent Triangles

Same shape and same size.

CONDITION FOR SIMILARITY

- AA condition
- SSS condition
- SAS condition

Note: In Similar, corresponding angles are equal and corresponding sides are in proportion.

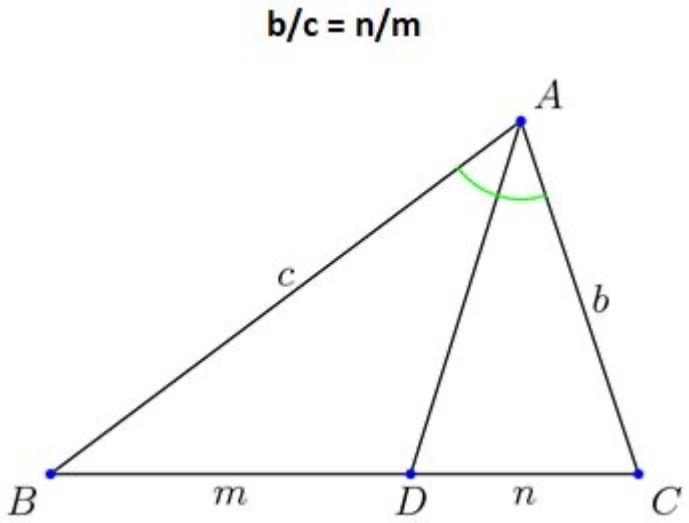
CONDITION FOR CONGRUENCY

- SAS condition
- ASA condition
- SSS condition
- RHS condition

Note: In Congruency, corresponding angles and sides are equal.

THEOREMS

Angle Bisector Theorem:

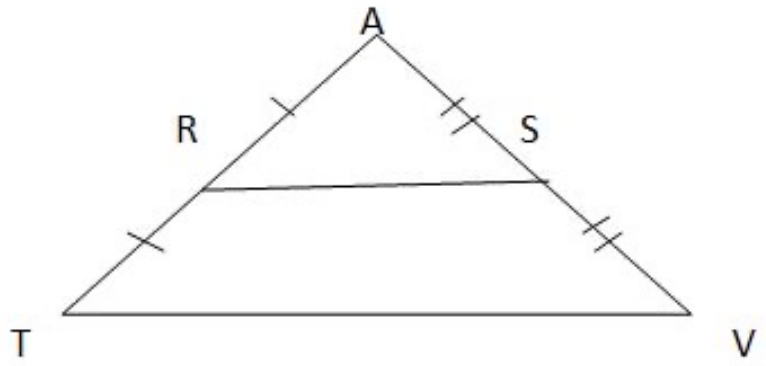


THEOREMS

Mid-point Theorem:

RS || TV

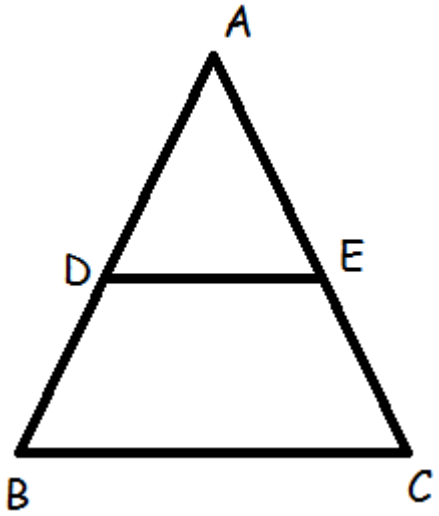
RS = ½ TV



THEOREMS

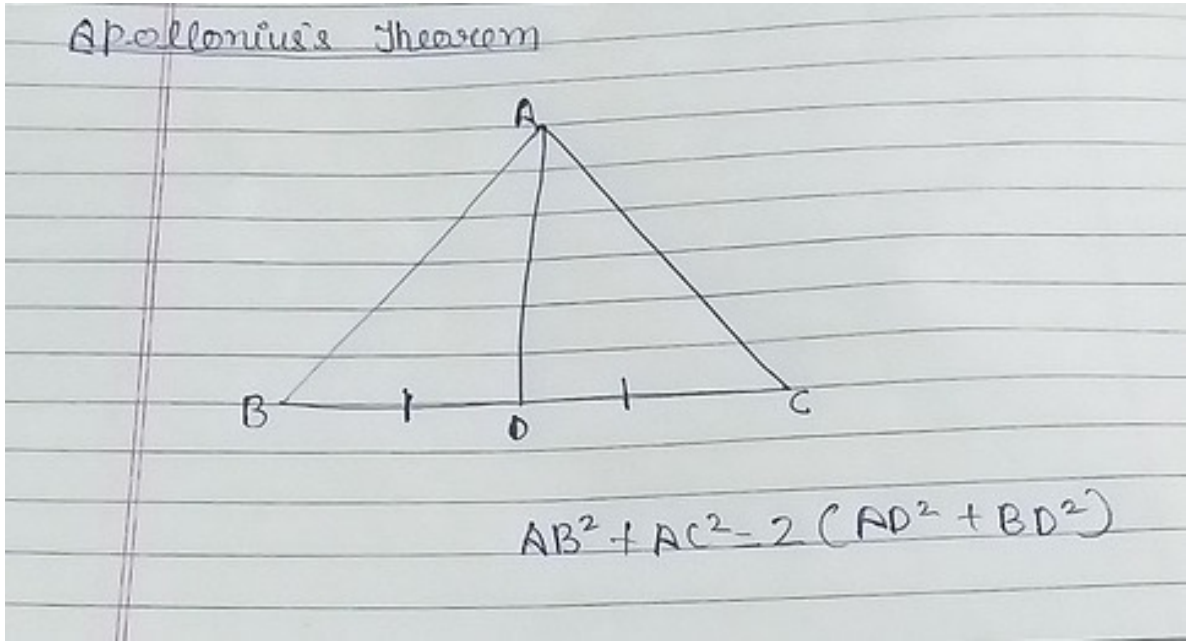
Basic Proportionality Theorem:

$$AD/DB = AE/EC$$



THEOREMS

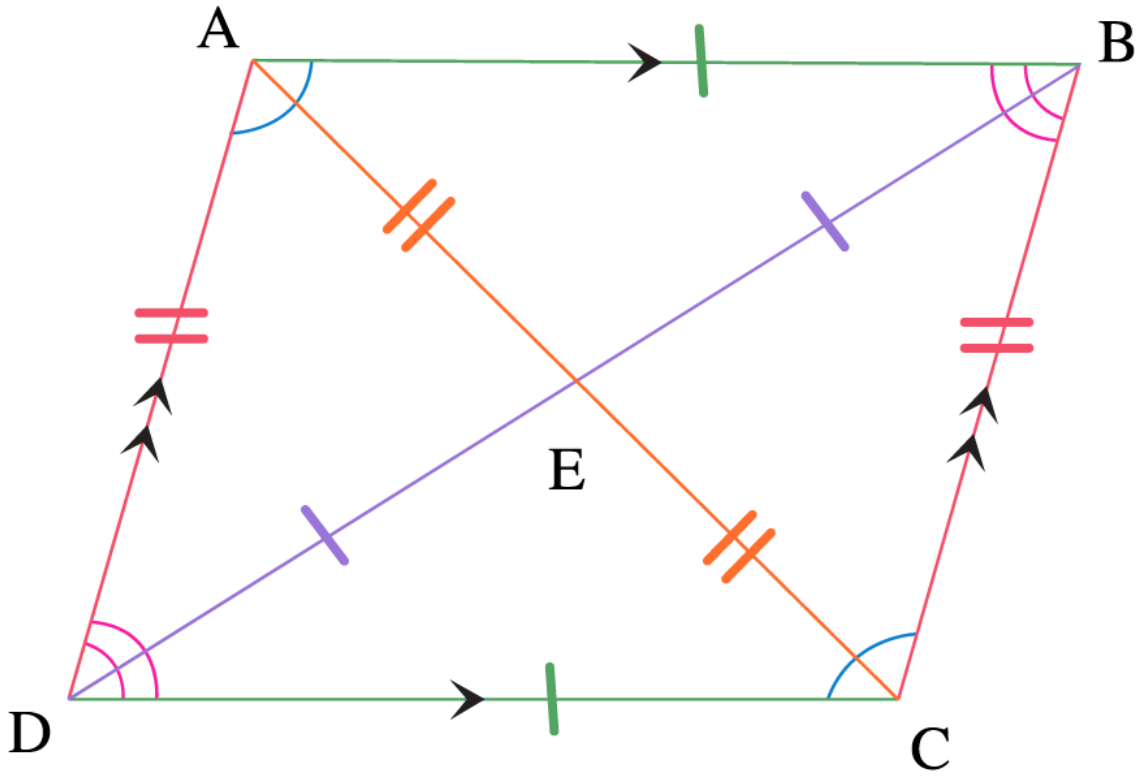
Apollonius Theorem:



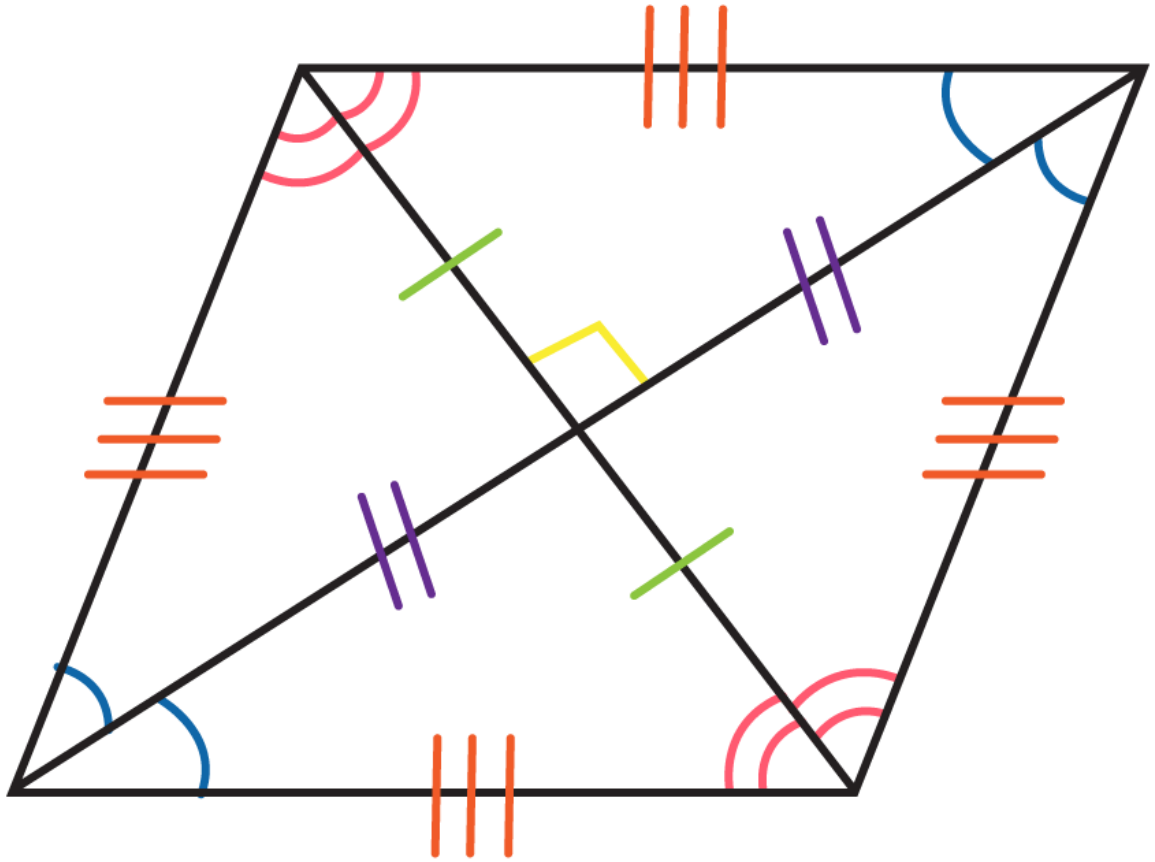
REGULAR POLYGON

- A polygon with all sides are equal length.
- The sum of interior angles is $(n - 2) \times 180$, where n is the number of sides.
- All the interior angles in a regular polygon are equal.
- The sum of exterior angles of a polygon is 360°.
- The number of diagonals in a polygon = $n(n-3)/2$, where n is the number of polygon sides.

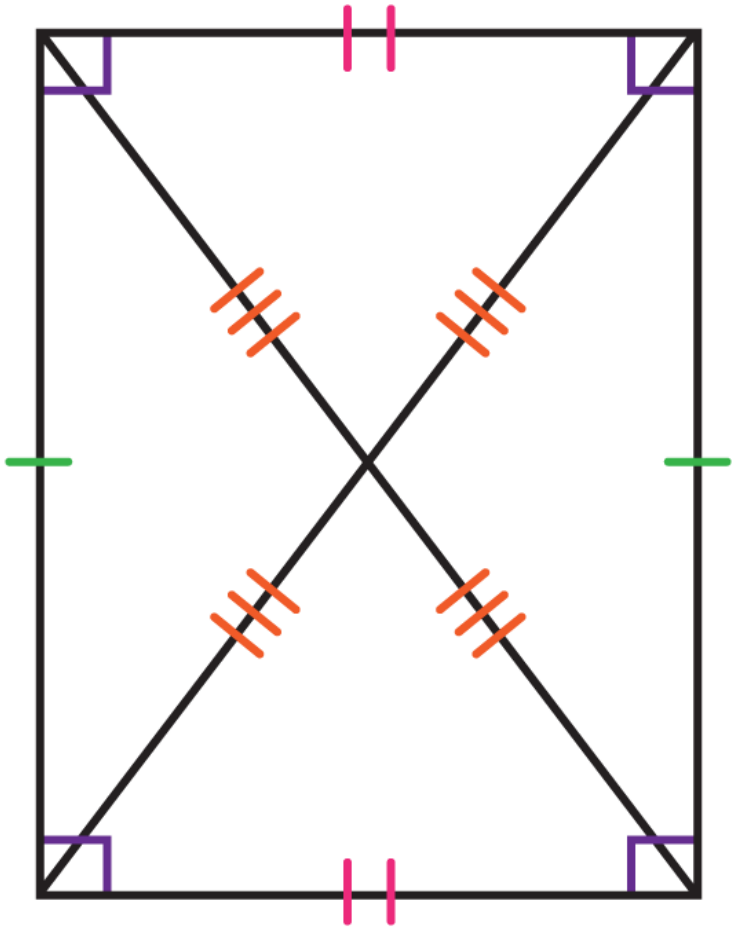
PARALLELOGRAM



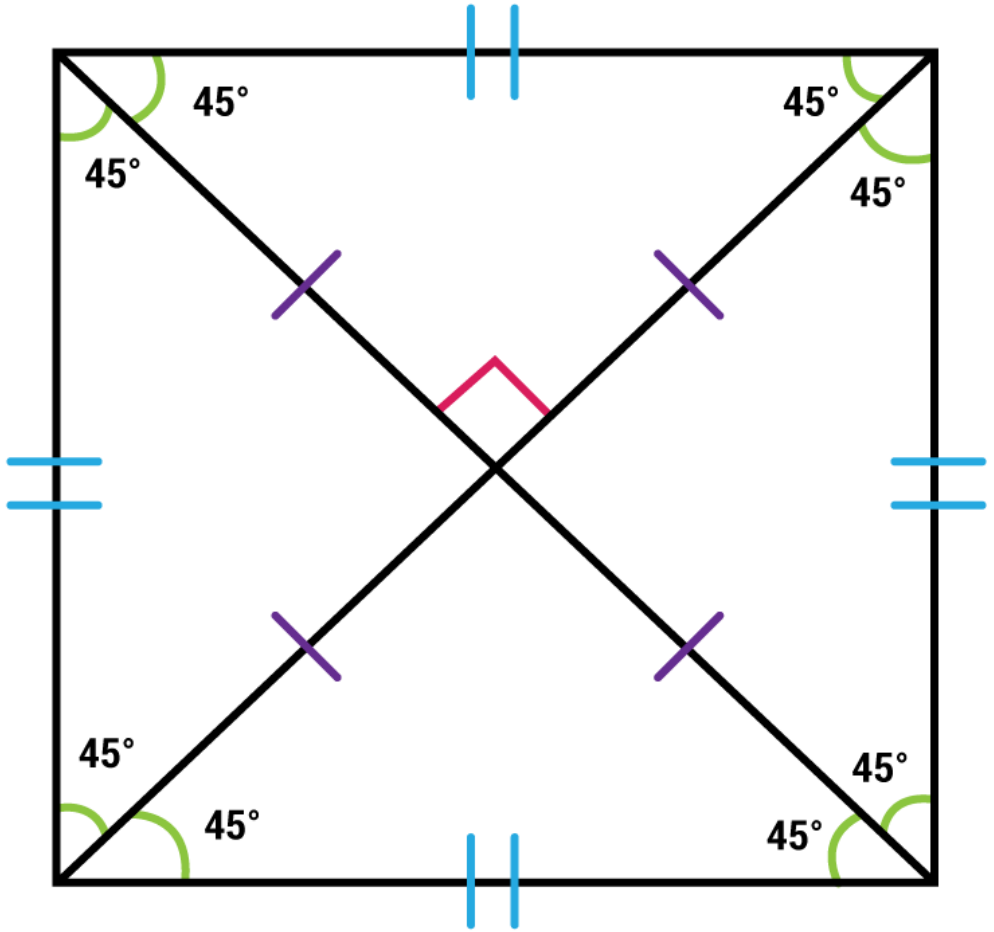
RHOMBUS



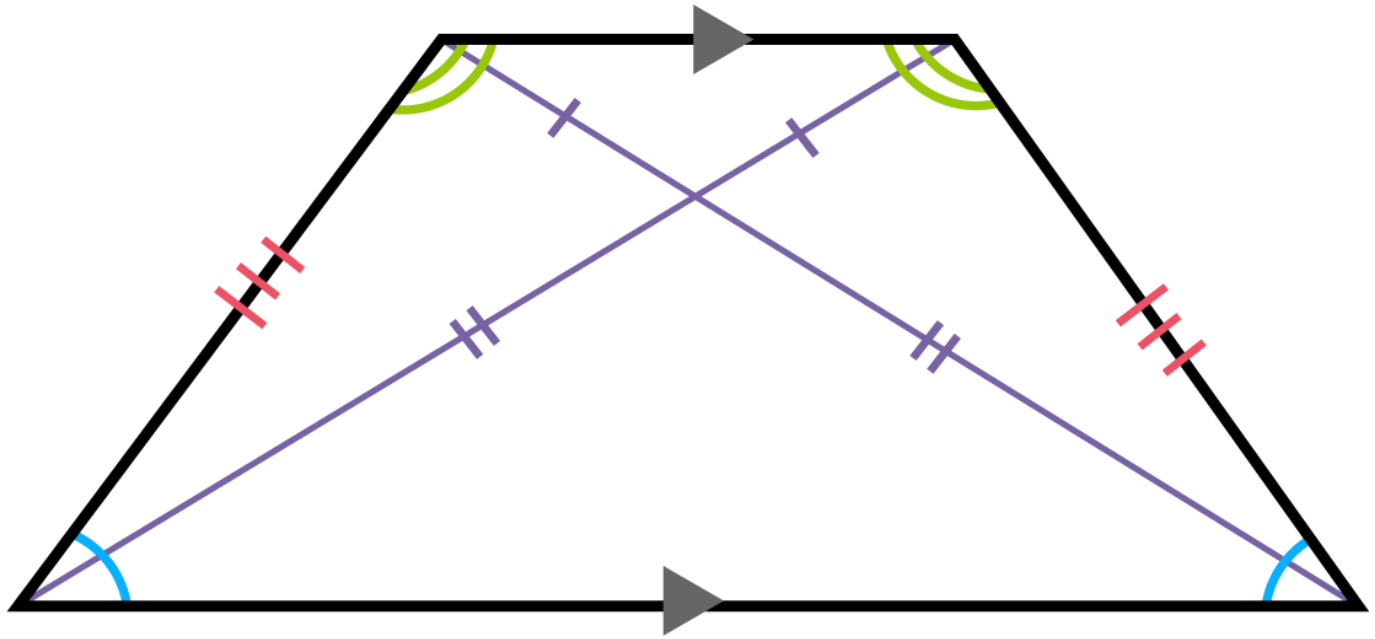
RECTANGLE



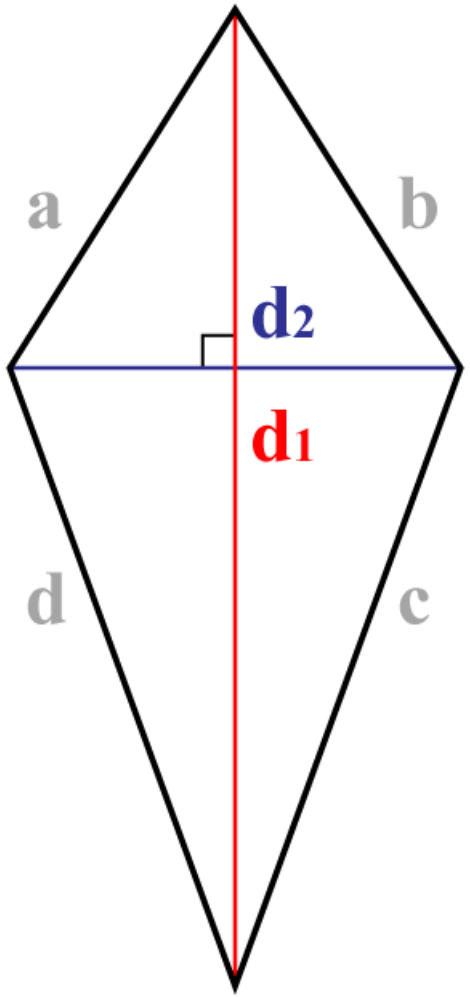
SQUARE



TRAPEZIUM

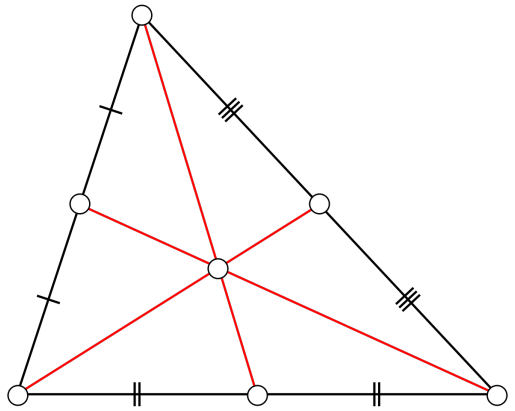


KITE

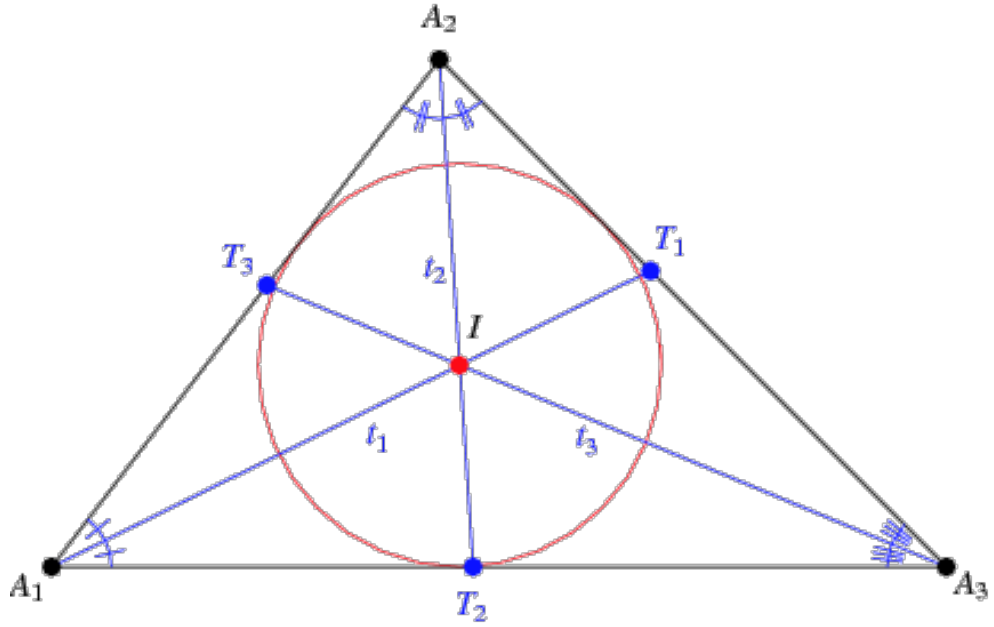


IMPORTANT LINES & POINTS IN A TRIANGLE

- Median – Centroid

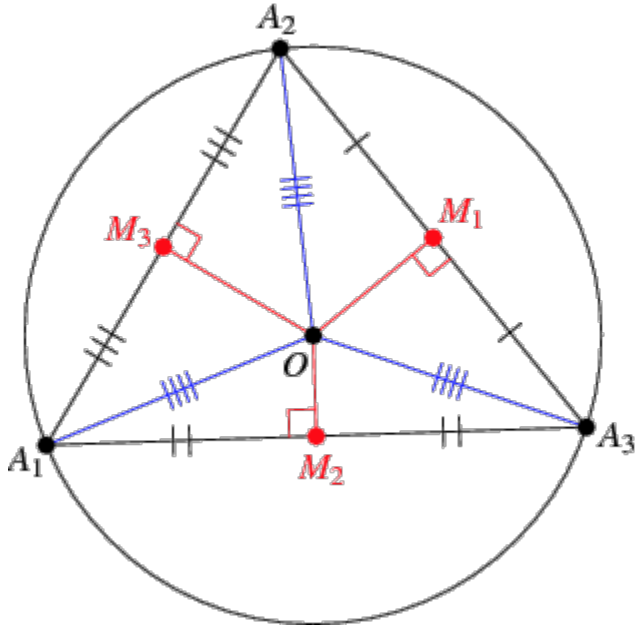


- Angle bisector – Incentre

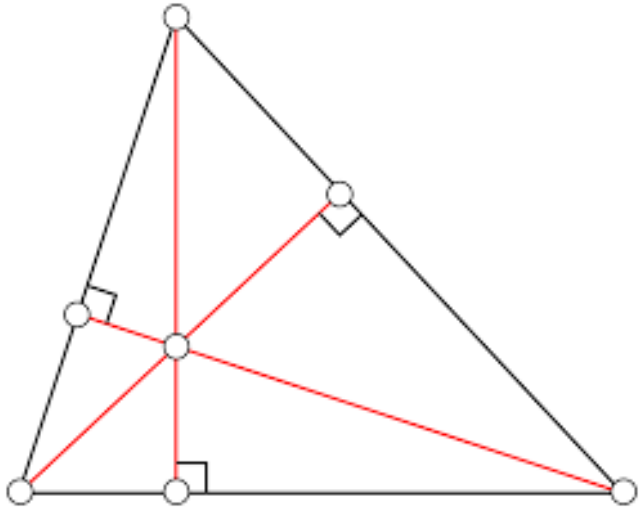


IMPORTANT LINES & POINTS IN A TRIANGLE

- Perpendicular bisector – Circum-centre

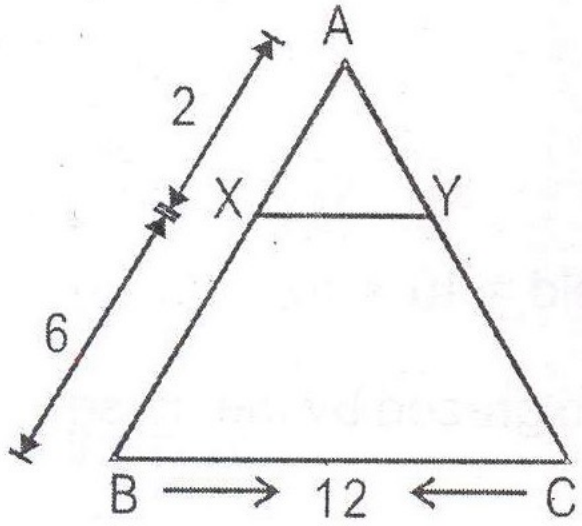


- Altitudes– orthocentre



PROBLEM 6

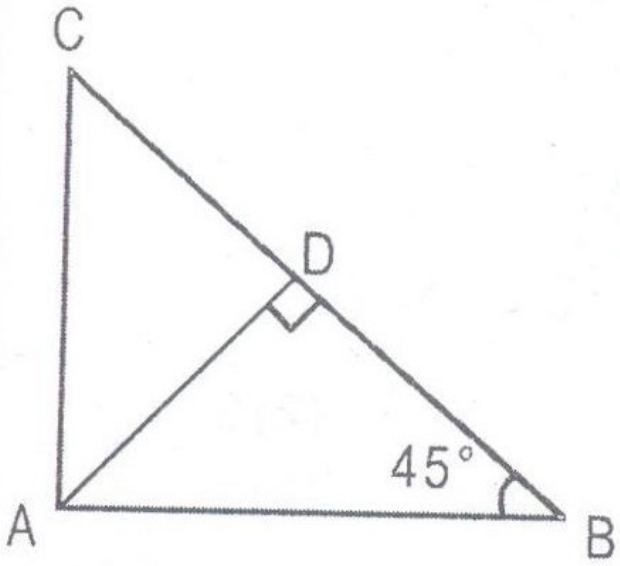
In the given figure XY | | BC. Find the length of XY.



(1) 4
(2) 1
(3) 3 ✓
(4) 2

PROBLEM 7

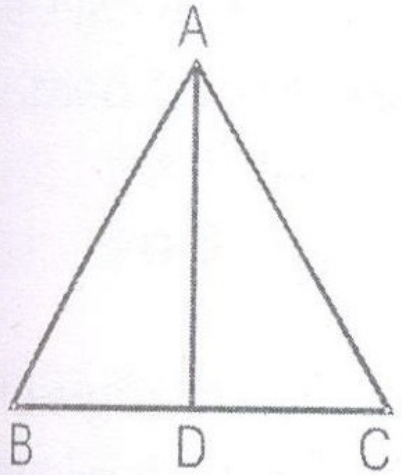
In ΔABC, right angled at A, AD is perpendicular to BC and $\angle B = 45°$. If AB = x, find the length of AD in terms of x.



Ans: $x/\sqrt{2}$

PROBLEM 8

In the given figure AD is the bisector of ∠BAC meeting BC, at D. If AB = 16 units and AC = 8 units, then find BD : CD.



(1) 3 : 2
(2) 3 : 1
(3) 2 : 6
(4) 2 : 1 ✓

PROBLEM 9

9. Perimeter of a Δ with integer sides is equal to 15. How many such triangles are possible?

a. 7 ✓
b. 6
c. 8
d. 5

PROBLEM 10

10. Area of a Rhombus of perimeter 56 cm is 100 sq. cms. Find the sum of the lengths of its diagonals

a. 33.40
b. 34.40 ✓
c. 31.20
d. 32.30

THANK YOU