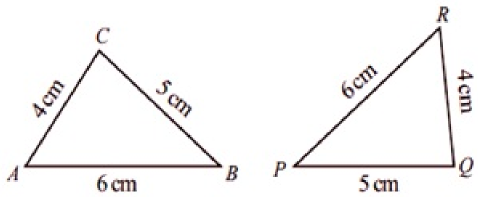
# 1. Equal Triangles

## Questions Pg-11

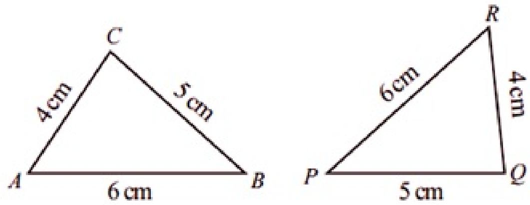
### 1 A. Question

In each pair of triangles below, find all pairs of matching angles and write them down.




### Answer

To find all pairs of matching angles, we always look for the corresponding sides or similar sides in the two triangles and the angles between any two of the corresponding sides in the two figures are matching angles.




In the triangles given above, we first find the corresponding sides or similar sides.

AC = RQ = 4 cm

CB = PQ = 5 cm

AB = PR = 6 cm

To find pairs of matching angles, the angles between any two of the corresponding sides in the two triangles are matching angles.

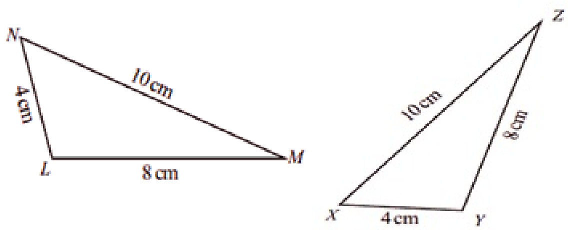
a) Angle between AC(4 cm) and AB(6 cm), ∠CAB = Angle between RQ(4 cm) and PR(6 cm) , ∠PRQ.

b) Angle between AC(4 cm) and CB(5 cm), ∠ACB = Angle between RQ(4 cm) and PQ(5 cm) , ∠RQP.

c) Angle between CB(5 cm) and AB(6 cm), ∠CBA = Angle between PQ(5 cm) and PR(6 cm) , ∠QPR.

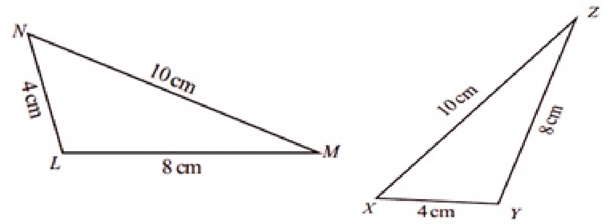
### 1 B. Question

In each pair of triangles below, find all pairs of matching angles and write them down.




### Answer

To find all pairs of matching angles, we always look for the corresponding sides or similar sides in the two triangles and the angles between any two of the corresponding sides in the two figures are matching angles.




In the triangles given above, we first find the corresponding sides or similar sides.

NL = XY = 4 cm

LM = YZ = 8 cm

NM = XZ = 10 cm

To find pairs of matching angles, the angles between any two of the corresponding sides in the two triangles are matching angles.

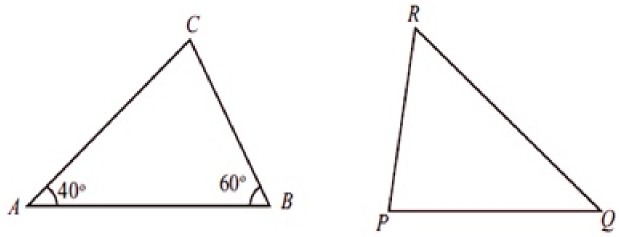
a) Angle between NL (4 cm) and LM (8 cm), ∠NLM = Angle between XY (4 cm) and YZ (8 cm) , ∠XYZ.

b) Angle between LM (8 cm) and NM (10 cm), ∠LMN = Angle between YZ (8 cm) and XZ (10 cm) , ∠YZX.

c) Angle between NM (10 cm) and NL (4 cm), ∠MNL = Angle between XZ (10 cm) and XY (4 cm) , ∠ZXY.

**2. Question**

In the triangles below, AB = QR BC = RP CA = PQ




Compute ∠C and ΔABC and all angles of ΔPQR.

**Answer**

We know sum of all interior angles of a triangle is $180^o$.

In ΔABC,

$\angle a + \angle b + \angle c = 180^o$

$40^o + 60^o + \angle c = 180^o$

$100^o + \angle c = 180^o$

$\angle c = 180^o - 100^o$

$\angle c = 80^o$

To find all angles in ΔPQR:

Given, AB = QR

BC = RP

CA = PQ

To find pairs of matching angles, the angles between any two of the corresponding sides in the two figures are matching angles.

Thus,

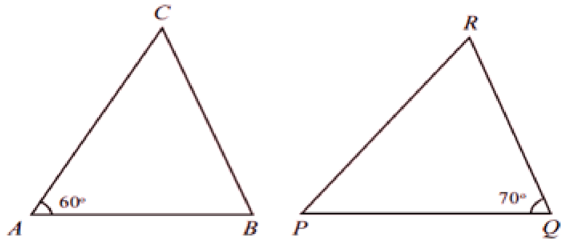
$\angle CAB = \angle PQR = 40^o$

$\angle ABC = \angle QRP = 60^o$

∠BCA = ∠RPQ = 80⁰

**3. Question**

In the triangles below, AB = QR BC = PQ CA = RP




Compute the remaining angles of both triangles.

**Answer**

Given, AB = QR

BC = PQ

CA = RP, which are corresponding sides of both triangles.

Thus, angles between any two of the corresponding sides in the two figures are matching angles.

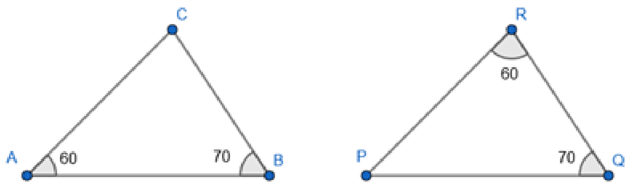
Finding matching angles will help us to compute the remaining angles.

Therefore,

∠ABC = ∠PQR = 70⁰

∠PRQ = ∠CAB = 60⁰

Now, we have,




In ΔABC,

∠a + ∠b + ∠c = 180⁰

60⁰ + 70⁰ + ∠c = 180⁰

130⁰ + ∠c = 180⁰

∠c = 180⁰-130⁰

∠c = 50⁰

In ΔPQR,

∠p + ∠q + ∠r = 180⁰

∠p + 70⁰ + 60⁰ = 180

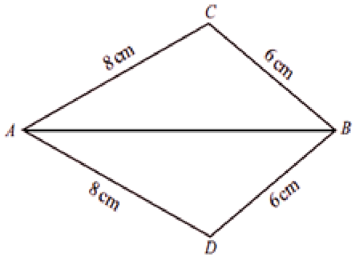
∠p + 130⁰ = 180⁰

∠p = 180⁰-130⁰

∠p = 50⁰

**4. Question**

Are the angles of ΔABC and ΔABD equal in the figure above? Why




**Answer**

Since AC = AD and CB = DB, ∠ACB = ∠ADB.

As both the triangles have AB as a common side, angle between any side and AB in ΔABC will be a matching angle to angle between

any side and AB in ΔABD.

So, AC = AD and AB which is common, ∠CAB = ∠CAB.

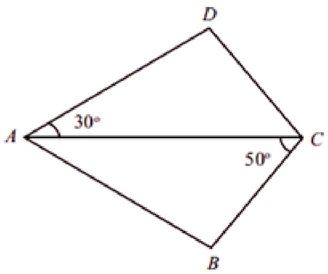
And, CB = DB and AB which is common, ∠CBA = ∠DBA.

Hence, all the angles of ΔABC and ΔABD are equal.

**5. Question**

In the quadrilateral, ABCD shown below,

AB = AD BC = CD




Compute the angles of the quadrilateral.

**Answer**

Given, AB = AD

BC = CD

AC which is common to both ΔADC and ΔABC.

So, ∠DAC = ∠CAB = 30 as AB = AD and AC which is common.

And, ∠DCA = ∠ACB = 50 as BC = CD and AC which is common.

Now, we know sum of all interior angles of a triangle is $180^0$.

In ΔADC,

$\angle a + \angle d + \angle c = 180^0$

$30^0 + \angle d + 50^0 = 180$

$80^0 + \angle d = 180^0$

$\angle d = 180^0 - 80^0$

$\angle d = 100^0$

In ΔABC,

$\angle a + \angle b + \angle c = 180^0$

$30^o + \angle b + 50^o = 180^o$

$80^o + \angle b = 180^o$

$\angle b = 180^o - 80^o$

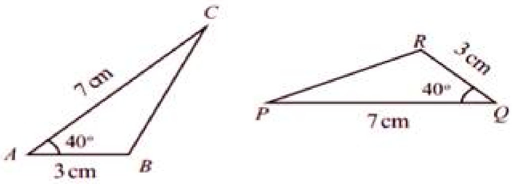
$\angle b = 100^o$

## Questions Pg-15

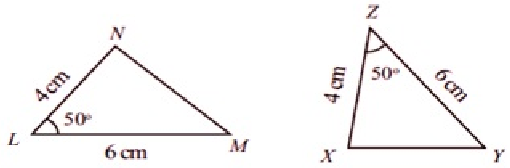
**1. Question**

In each pair of triangles below, find the pairs of matching angles and write then down.

(i)



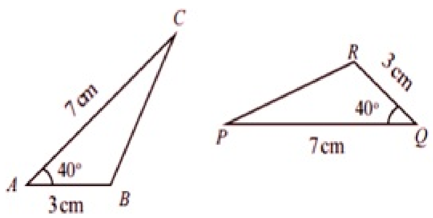

(ii)




**Answer**

To find all pairs of matching angles, we always look for the corresponding sides or similar sides in the two triangles and the angles between any two of the corresponding sides in the two figures are matching angles.

(i)

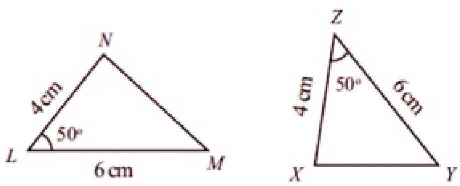



We can see that $\angle CAB = \angle PQR = 40^o$ as shown in the figure.

Angle between AC (7 cm) and CB, $\angle ACB$ = Angle between PQ(7 cm) and PR , $\angle QPR$.

Angle between AB (3 cm) and CB, $\angle ABC$ = Angle between RQ(3 cm) and PR , $\angle PRQ$.

(ii)



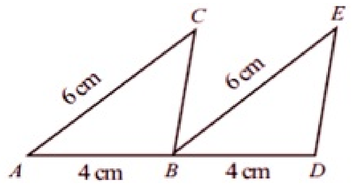

We can see that $\angle NLM = \angle XZY = 50^o$ as shown in the figure.

Angle between LN (4 cm) and NM, $\angle LNM$ = Angle between XZ (4 cm) and XY, $\angle ZXY$

Angle between LM (6 cm) and NM, $\angle LMN$ = Angle between YZ(6 cm)and XY , $\angle ZYX$

**2. Question**

In the figure below, AC and BE are parallel lines:




i) Are the length of BC and DE equal? Why?

ii) Are BC and DE parallel? Why?

**Answer**

AC = BE = 6 cm

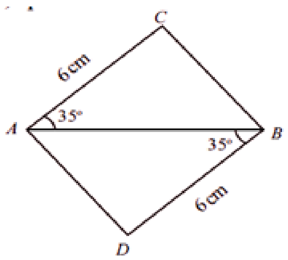
AB = BD = 4 cm

(i) Yes, the length of BC and DE is equal because they are the corresponding sides of two equal triangles.

(ii) Yes, BC and DE are parallel because they are equal and corresponding sides of two equal triangles.

**3. Question**

Is ACBD in the figure, a parallelogram? Why?



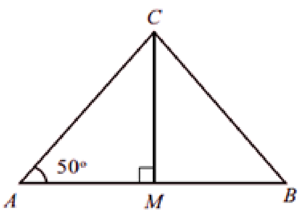

**Answer**

We can see that the diagonal AB makes the same angle of 35⁰ with each AC(6 cm) and DB(6 cm). Hence, it acts as a transversal

between AC and DB which makes AC and DB parallel and equal lines. Hence, ABCD is a parallelogram.

**4. Question**

In the figure below, M is the midpoint of the line AB. Compute the other two angles of ΔABC.




**Answer**

Given, M is the midpoint of the line AB and ∠m = 90⁰.

∠a = 50

We know sum of all interior angles of a triangle is 180⁰.

In ΔAMC,

∠a + ∠b + ∠c = 180⁰

50⁰ + 90 + ∠c = 180⁰

140⁰ + ∠c = 180⁰

∠c = 180⁰-140⁰

∠c = 40⁰

In ΔMBC,

∠c = 40⁰

∠m = 90⁰

∠b = ?

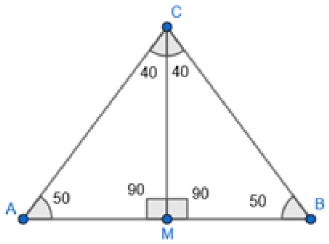
∠m + ∠b + ∠c = 180⁰

90⁰ + ∠b + 40⁰ = 180⁰

130⁰ + ∠b = 180⁰

∠b = 180⁰-130⁰

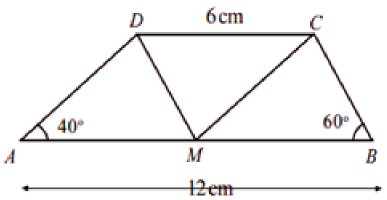
∠b = 50⁰




∠a = 50⁰, ∠b = 50⁰, ∠c = 80⁰

**5. Question**

In the figure below, the lines AB and CD are parallel and M is the midpoint of AB.




i) Computer the angles of ΔAMD, ΔMBC and ΔDCM?

ii) What is special about the quadrilaterals AMCD and MBCD?

**Answer**

Given, lines AB and CD are parallel and M is the midpoint of AB.

As AB and CD are parallel, AD, DM, MC and CB are transversal.

(i) ∠AMD = ∠MBC = 60⁰ (corresponding angles)

∠CMB = ∠DAM = 40⁰ (corresponding angles)

∠CDM = AMD = 60⁰ (alternate interior angles)

∠DCM = ∠CMB = 40⁰ (alternate interior angles)

On straight line AMB,

∠ AMD + ∠DMC + ∠CMB = 180⁰ (angles in a straight line)

60⁰ + ∠DMC + 40⁰ = 180⁰

∠DMC + 100⁰ = 180⁰

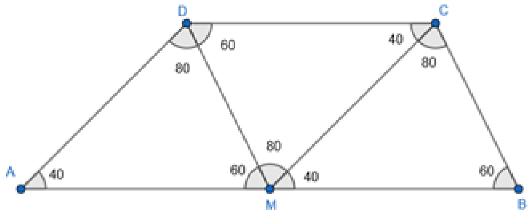
∠DMC = 180⁰-100⁰

∠DMC = 80⁰

∠ADM = ∠DMC = 80⁰ (alternate interior angles)

∠MCB = ∠DMC = $80^0$ (alternate interior angles)

Therefore, now we have,




(ii) Quadrilaterals AMCD and MBCD both contain two equal triangles. That is what makes special.

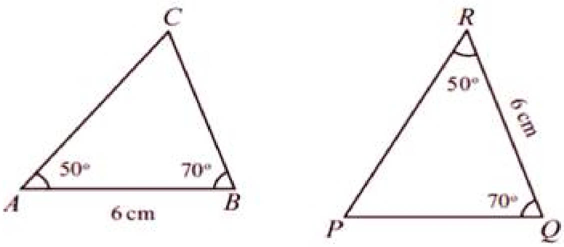
Quad. AMCD consists of ΔAMD and ΔDMC.

Quad. MBCD consists of ΔMBC and ΔDMC.

## Questions Pg-21

**1 A. Question**

In each pair of triangles below, find matching pairs of sides and write their names.




**Answer**

In Δ ABC and Δ PQR,

(AB) = l(RQ) = 6 cm

∠A = ∠R = 50°

∠B = ∠Q = 70°

According to property,

If one side of a triangle and angle at its ends are equal to one side of another triangle and the angles at its ends, then the third angles are also equal and the sides opposite equal angle are equal.

In Δ ABC and Δ PQR,

BC is opposite ∠A and PQ is opposite ∠R

Also, AC is opposite ∠B and PR is opposite ∠Q

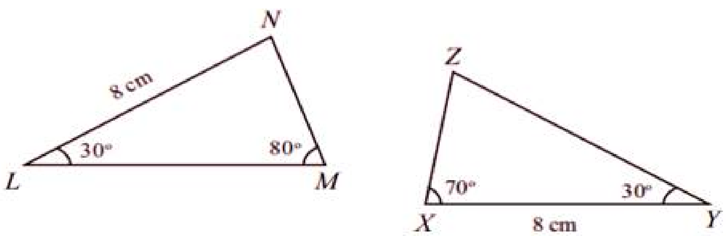
∴ BC = PQ

And AC = PR

Also, AB = RQ = 6 cm (given) opposite \angle l anglee

**1 B. Question**

In each pair of triangles below, find matching pairs of sides and write their names.



**Answer**

In Δ LMN and Δ XYZ,

LN = XY = 8 cm

∠L = ∠Y = 30°

In Δ LMN, sum of all angles of triangle is 180°

∴ ∠L + ∠M + ∠N = 180°

30 + 80 + ∠N = 180

110 + ∠N = 180

∴ ∠N = 180-110

= 70°

Here, ∠N = ∠X = 70°

According to property,

If one side of a triangle and angle at its ends are equal to one side of another triangle and the angles at its ends, then the third angles are also equal and the sides opposite equal angle are equal.

{Here, LN and XY is the required side}

In Δ LMN and Δ XYZ,

NM is opposite ∠L and XZ is opposite ∠Y

Also, LM is opposite ∠N and YZ is opposite ∠X

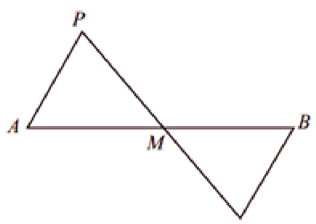
∴ NM = XZ

And LM = YZ

Also, LN = XY = 8 cm (given)

**2. Question**

In the figure, AP and BQ equal and parallel are lines drawn at the ends of the line AB. The point of intersection of PQ and AB is marked as M.




i) Are the sides of Δ AMP equal to the sides of Δ BMQ? Why?

ii) What is special about the position of M on AB?

iii) Draw a line 5.5 centimeters long. Using a set square, locate the midpoint of this line.

**Answer**

Given-

AP = BQ

And AP ∥ BQ

According to the property,

If a pair of equal and opposite sides is parallel, then the four points connected form a parallelogram.

∴ the imaginary quadrilateral APBQ is a parallelogram.

AB and PQ are diagonals of parallelogram.

Also, the diagonals of parallelogram bisect each other.

∴ PM = MQ

And AM = MB

Also, ∠AMP = ∠BMQ, (vertically opposite angles)

According to property,

When two sides of a triangle and angle made by them are equal to the two sides and angle made by them of another triangle, then the third sides and the corresponding two angles are also equal.

∴ AP = BQ

Hence, the sides of the two triangles are equal.

ii) Specialty of point M,

It divides both sides in equal ratio i.e. 1:1

(Reason, Discussed above i.e. the imaginary quadrilateral APBQ is a parallelogram and AP,BQ are its diagonals).

iii) Steps for construction,

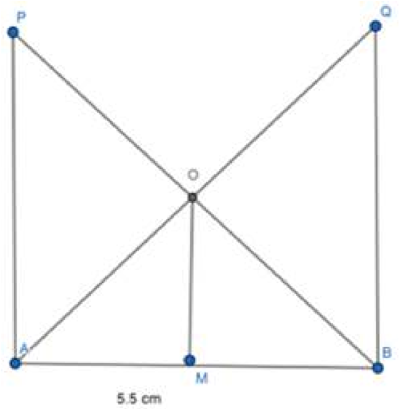
1. Draw a line AB = 5.5 cm

2. Using set-square draw two perpendicular lines on AB at each points A and B of length 5.5 cm as AP( = 5.5 cm) and BQ( = 5.5 cm)

3.Join lines PB and AQ and let them intersect at point O.

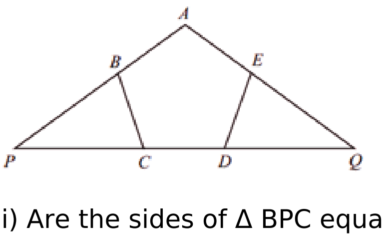
4.Drop a perpendicular from O to AB and let the new point be M.

M is the required midpoint of AB.




**3. Question**

In the figure, ABCDE is pentagon with all sides of the same length and all angles of the same size. The sides AB and AE extended, meet the side CD extended at P and Q.




i) Are the sides of Δ BPC equal to the sides of Δ EQD? Why?

ii) Are the side of AP and AQ of Δ APQ equal? Why?

**Answer**

Here, all angles of the polygon are equal(a regular polygon).

∴ ∠ABC = ∠AED ...(eq)1

(∠PBC,∠ABC) and (∠AED,∠QED) form a linear pair.

∠PBC = 180-∠ABC (Linear angles are supplementary)

= 180-∠AED (from eq1)

∠PBC = ∠QED ...(eq)2 (∠AED and ∠QED form linear pair).

∠BCD = ∠EDC ...(eq)2

(∠BCD, ∠BCP) and (∠EDC,∠EDQ) form a linear pair.

∠BCP = 180-∠BCD (Linear angles are supplementary)

= 180-∠EDC (from eq2)

∠BCP = ∠EDQ ...(eq)3

According to property,

If one side of a triangle and angle at its ends are equal to one side of another triangle and the angles at its ends, then the third angles are also equal and the sides opposite equal angle are equal.

In ΔPBC and Δ QED,

∠BCD = ∠EDC

∠BCP = ∠EDQ

Also, BC = DE (a regular polygon)

Hence, PC = DQ (∠PBC = ∠DEQ)

PB = EQ (∠PCB = ∠EDQ)

And ∠BPC = ∠EQD ...(eq)4

Hence, the sides are equal.

ii) From eq4,

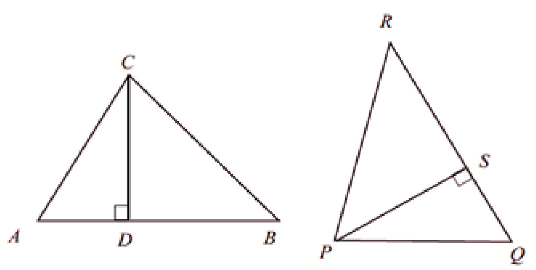
∠BPC = ∠EQD

∴ ∠APQ = ∠AQP

Hence, AP = AQ (converse of isosceles angle theorem).

**4. Question**

In Δ ABC and Δ PQR shown below.




AB = QR BC = RP CA = PQ

i) Are CD and PS equal? Why?

ii) What is the relation between the areas of Δ ABC and Δ PQR?

**Answer**

In Δ ABC and Δ PQR

AB = QR

BC = RP

CA = PQ

∴ Δ ABC ≅ Δ QRP {the corresponding sides on both sides of the equation are equal}

∴ ∠ABC = ∠QRP …(eq)1

In Δ CDB and Δ PSR,

∠DBC(∠ABC) = ∠SRP(∠QRP) …(eq)2 (from eq1)

∠CDB = ∠PSR = 90°

Thus, in these triangles 2 angles are equal

Since, sum of all angles of a triangle is 180°

∴ third angle is also equal

∴ ∠DCB = ∠RPS …(eq)3

According to property,

If one side of a triangle and angle at its ends are equal to one side of another triangle and the angles at its ends, then the third angles are also equal and the sides opposite equal angle are equal.

{Here, common side is BC and RP

∠DCB = ∠RPS (from eq3)

∠DBC = ∠SRP (from eq2)}

Applying it in Δ CDB and Δ PSR

CD = PS …(eq)4 (CD is opposite ∠CBD,PS is opposite ∠PRS and ∠CBD = ∠PRS)

ii) For a triangle, $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$

∴ area(Δ ABC) = $\frac{1}{2} \times AB \times CD$

And area (ΔPQR) = $\frac{1}{2} \times QR \times PS$

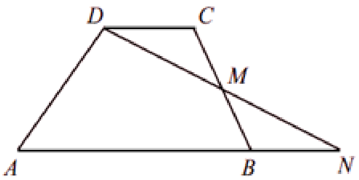
Here, AB = QR (given)

And, CD = PS (from eq4)

Hence, areas of both the triangles are equal.

**5 A. Question**

In the quadrilateral ABCD shown below, the sides AB and CD are parallel. M is the midpoint of the side BC.




The lines DM and AB extended, meet at N.

Are the areas of Δ DCM and Δ BMN equal? Why?

**Answer**

Given-

AB ∥ CD

BM = MC

In Δ DCM and Δ BMN,

∠DMC = ∠BMN (vertically opposite angles)

BM = MC

∠DCM = ∠MBN (alternate angle test, DC ∥ BN with BC as transversal).

Using the property,

If one side of a triangle and angle at its ends are equal to one side of another triangle and the angles at its ends, then the third angles are also equal and the sides opposite equal angle are equal.

∴ ∠CDM = ∠MNB

DM = MN

DC = BN

As all 3 sides and angles are equal.

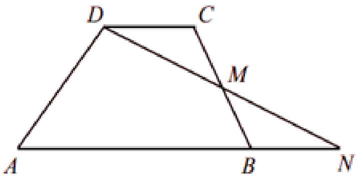
Δ DCM ≅ Δ NBM

Also, congruent triangles have equal areas.

∴ area(Δ DCM) = area(BMN) …(eq)1

**5 B. Question**

In the quadrilateral ABCD shown below, the sides AB and CD are parallel. M is the midpoint of the side BC.




The lines DM and AB extended, meet at N.

What is the relation between the areas of the quadrilateral ABCD and the triangle AND?

**Answer**

area of a parallelogram = $\text{base} \times \text{height}$

area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

area of parallelogram = area(ABCD)

= area(ADMB) + area(Δ DCM) …(eq)1

Area of triangle = area(Δ AND)

= area(ADMB) + area(Δ BMN)

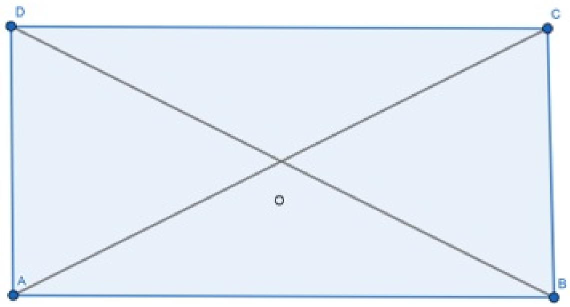
= area(ADMB) + area(Δ DCM) (from eq1) …(eq)2

∴ area of parallelogram = area of triangle

**6. Question**

Are the two diagonals of a rectangle equal? Why?

**Answer**




A rectangle is a parallelogram where each angle is a right angle.

Here, AD = BC …(eq)1

And AB = CD

According to Pythagoras theorem,

$(\text{Hypotenuse})^2 = (\text{one side})^2 + (\text{other side})^2$

In Δ ABD,

Hypotenuse = BD

One side = AB

And other side = AD

$\therefore (BD)^2 = (AB)^2 + (AD)^2$ …(eq)2

In Δ ABC,

Hypotenuse = AC

One side = AB

And other side = BC

$\therefore (AC)^2 = (AB)^2 + (BC)^2$

$= (AB)^2 + (AD)^2$ …(eq)3 …(from eq1)

As is clear from (eq)2 and (eq)3

$BD^2 = AC^2$

Taking square root on both sides,

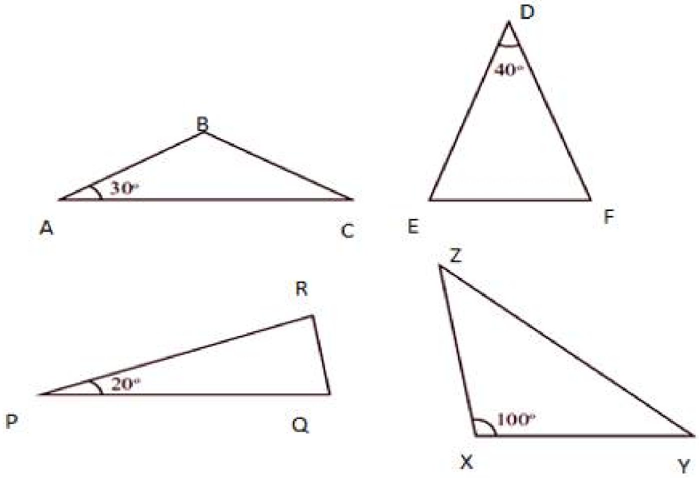
BD = AC

∴ Diagonals of a rectangle are equal.

## Questions Pg-26

### 1. Question

Some isosceles triangles are drawn below. In each, one angle is given. Find the other angles.




**Answer**

In first figure,

As seen it seems AB = BC (since it is a isosceles triangle).

Also, if 2 sides of a triangle are equal, the angles opposite equal sides are also equal.

∴ ∠BAC(∠A) = ∠BCA(∠C) = 30°

In a triangle,

Sum of all angles of a triangle is 180°

Hence, in Δ ABC,

∠A + ∠B + ∠C = 180°

∴ 30 + ∠B + 30 = 180°

∠B + 60 = 180°

∴ ∠B = 180-60

= 120°

In second figure,

As seen it seems DE = DF (since it is a isosceles triangle).

Also, if 2 sides of a triangle are equal, the angles opposite equal sides are also equal.

∴ ∠DEF(∠E) = ∠DFE(∠F) = y° ...(eq)1

In a triangle,

Sum of all angles of a triangle is 180°

Hence, in Δ DEF,

∠D + ∠E + ∠F = 180°

∴ 40 + y + y = 180°

∴ 40 + 2y = 180

∴ 2y = 180-40

= 140°

∴ $y = \frac{140}{2} = 70°$

Hence, ∠E = ∠F = 70° (from eq1)

In 3rd figure,

As seen it seems PQ = PR (since it is a isosceles triangle).

Also, if 2 sides of a triangle are equal, the angles opposite equal sides are also equal.

∴ ∠PQR(∠Q) = ∠PRQ(∠R) = y° ...(eq)1

In a triangle,

Sum of all angles of a triangle is 180°

Hence, in Δ PQR,

∠P + ∠Q + ∠R = 180°

∴ 20 + y + y = 180°

∴ 20 + 2y = 180

∴ 2y = 180-20

= 160°

$\therefore y = \frac{160}{2} = 80°$

Hence, ∠Q = ∠R = 80° (from eq1)

In 4$^{th}$ figure,

As seen it seems XY = XZ (since it is a isosceles triangle).

Also, if 2 sides of a triangle are equal, the angles opposite equal sides are also equal.

∴ ∠XYZ(∠Y) = ∠XZY(∠Z) = m° ...(eq)1

In a triangle,

Sum of all angles of a triangle is 180°

Hence, in Δ XYZ,

∠X + ∠Y + ∠Z = 180°

∴ 100 + m + m = 180°

∴ 100 + 2m = 180

∴ 2m = 180-100

= 80

$\therefore m = \frac{80}{2} = 40°$

Hence, ∠Y = ∠Z = 40° (from eq1)

**2. Question**

One angle of an isosceles triangle is 90°. What are the other two angles?

**Answer**

Let in Δ ABC,

∠A = 90°

It is given that triangle is a isosceles triangle.

Case 1

Two equal angles both equal to 90°

If it happens, then sum of two equal angles will be = 90 + 90 = 180°

But, sum of all angles of a triangle is 180°

Thus, the third angle = 180-180 = 0

But, this is not possible.

Case 2

Two equal angles other than right angle.

If ∠A = 90°

Let ∠B = ∠C = y°

Sum of all angles of a triangle is 180°

∴ ∠A + ∠B + ∠C = 180°

90 + y + y = 180°

90 + 2y = 180°

2y = 180-90

= 90

$\therefore y = \frac{90}{2} = 45°$

Hence the other 2 angles are 45°

**3. Question**

One angle of an isosceles triangle is 60°. What are the other two angles?

**Answer**

Let in Δ ABC,

∠A = 60°

It is given that triangle is a isosceles triangle.

Case 1

Two equal angles both equal to 60°

If it happens, then sum of two equal angles will be = 60 + 60 = 120°

But, sum of all angles of a triangle is 180°

Thus, the third angle = 180-120 = 60

Hence, other two angles are 60° each.

Case 2

Two equal angles other than given angle (∠A)

If ∠A = 60°

Let ∠B = ∠C = y°

Sum of all angles of a triangle is 180°

∴ ∠A + ∠B + ∠C = 180°

60 + y + y = 180°

60 + 2y = 180°

2y = 180-60

= 120

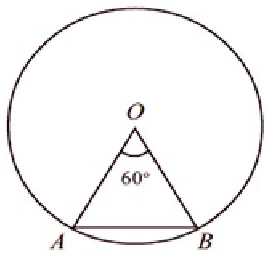
$\therefore y = \frac{120}{2} = 60°$

Hence the other 2 angles are also 60°

Hence, in both the cases the triangle is equilateral (each angle = 60°)

**4. Question**

In figure below, O is the center of the circle and A, B are point on the circle.




Compute ∠A and ∠B.

**Answer**

In Δ OAB,

OA = OB = r = Radius of circle

In a triangle with 2 equal sides, the angles opposite to equal sides are equal.

∴ ∠OAB(∠A) = ∠OBA(∠B) = y° ...(eq)1

In a triangle,

Sum of all angles of a triangle is 180°

∴ In Δ OAB,

∠O + ∠A + ∠B = 180°

∴ 60 + y + y = 180°

∴ 60 + 2y = 180°

∴ 2y = 180-60

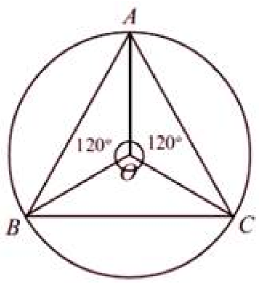
= 120

$\therefore y = \frac{120}{2} = 60°$

∴ ∠A = ∠B = 60° (from eq1)

**5. Question**

In the figure below, O is the center of the circle and A, B, C are points on the circle.




What are the angles of Δ ABC?

**Answer**

Here,

∠AOB = ∠AOC = 120°

Sum of a complete whole angle is 360°

∴ ∠AOB + ∠AOC + ∠BOC = 360°

120 + 120 + ∠BOC = 360°

∴ 240 + ∠BOC = 360°

∴ ∠BOC = 360-240

= 120°

In Δ OAB,

OA = OB = radius of circle

In a triangle with 2 equal sides, the angles opposite to equal sides are equal.

∴ ∠OAB = ∠OBA = y°

In a triangle,

Sum of all angles of a triangle is 180°

Hence, in Δ OAB,

∠OAB + ∠OBA + ∠AOB = 180°

∴ y + y + 120 = 180°

∴ 120 + 2y = 180

∴ 2y = 180-120

= 60

∴ $y = \frac{60}{2} = 30°$

∴ ∠OAB = ∠OBA = 30° ...(eq)1

In Δ OAC,

OA = OC = radius of circle

In a triangle with 2 equal sides, the angles opposite to equal sides are equal.

∴ ∠OAC = ∠OCA = y°

In a triangle,

Sum of all angles of a triangle is 180°

Hence, in Δ OAB,

∠OAC + ∠OCA + ∠AOC = 180°

∴ y + y + 120 = 180°

∴ 120 + 2y = 180

∴ 2y = 180-120

= 60

∴ $y = \frac{60}{2} = 30°$

∴ ∠OAC = ∠OCA = 30° ...(eq)2

In Δ OBC,

OB = OC = radius of circle

In a triangle with 2 equal sides, the angles opposite to equal sides are equal.

∴ ∠OCB = ∠OBC = y°

In a triangle,

Sum of all angles of a triangle is 180°

Hence, in Δ OCB,

∠OCB + ∠OBC + ∠COB = 180°

∴ y + y + 120 = 180°

∴ 120 + 2y = 180

∴ 2y = 180-120

= 60

∴ $y = \frac{60}{2} = 30°$

∴ ∠OAC = ∠OBC = 30° ...(eq)3

From equations 1,2 and 3

In Δ ABC

∠A = ∠BAO + ∠OAC

= 30 + 30

= 60°

∠B = ∠OBA + ∠OBC

= 30 + 30

= 60°

∠C = ∠OCB + ∠OCA

= 30 + 30

= 60°