CBSE NCERT Solutions for Class 9 Mathematics Chapter 7

Back of Chapter Questions

Exercise: 7.1

1. In quadrilateral ACBD, AC = AD and AB bisects ∠A as shown in figure. Show that ∆ABC ≅ ∆ABD. What can you say about BC and BD?

Solution:
In ∆ABD and ∆ABC
∠DAB = ∠CAB (AB is a bisection of ∠CAD)
AD = AC (given)
AB = AB (common)
∴ ∆ABD ≅ ∆ABC (by SAS postulate)
∴ BD = BC (by CPCT)

Hence, BC and BD are of equal length.

2. ABCD is a quadrilateral in which AD = BC and ∠CBA = ∠DAB as shown in figure. Prove that
   (i) ∆ABD ≅ ∆BAC
   (ii) BD = AC
   (iii) ∠ABD = ∠BAC
Solution:

(i) In \( \triangle BAC \) and \( \triangle ABD \)
\[ BC = AD \text{ (given)} \]
\[ \angle CBA = \angle DAB \text{ (given)} \]
\[ BA = AB \text{ (given)} \]
\[ \triangle ABD \cong \triangle BAC \text{ (by SAS postulate)} \]

(ii) \[ BD = AC \text{ (by CPCT rule)} \]

(iii) \[ \angle ABD = \angle BAC \text{ (by CPCT rule)} \]

Given \[ AD = BC \]
\[ \angle ADC = \angle BCD \]

3. \( AD \) and \( BC \) are equal perpendiculars to a line segment \( AB \) as shown in figure. Show that \( CD \) bisects \( AB \).

Solution:

In \( \triangle AOD \) and \( \triangle BOC \)
\[ \angle AOD = \angle BOC \text{ (verifying opposite angle)} \]
\[ \angle DAO = \angle CBO \text{ (90°)} \]
\[ AD = BC \text{ (given)} \]
∴ \( \triangle AOD \cong \triangle BOC \) (by AAS rule)

BO = AO \hspace{1cm} (by CPCT)

⇒ CD bisects AB

4. \( l \) and \( m \) are two parallel lines intersected by another pair of parallel lines \( p \) and \( q \) as shown in figure. Show that \( \triangle ABC \cong \triangle CDA \).

Solution:

In \( \triangle CDA \) and \( \triangle ABC \)

\( \angle DCA = \angle BAC \) (alternate interior angle of parallel line \( P \) and \( Q \))

CA = AC \hspace{1cm} (common)

\( \angle DAC = \angle BCA \) (alternate interior angle of parallel line \( l \) and \( m \))

\( \triangle ABC \cong \triangle CDA \) (by ASA rule).

5. Line \( l \) is the bisector of an angle \( \angle A \) and \( B \) is any point on \( l \). BP and BQ are perpendiculars from \( B \) to the arms of \( \angle A \) as shown in figure. Show that

(i) \( \triangle APB \cong \triangle AQB \)

(ii) BP = BQ or B is equidistant from the arms of \( \angle A \).
Solution:
In $\triangle AQB$ and $\triangle APB$

$AB = AB$ (common)

$\angle AQB = \angle APB \quad (90^\circ)$

$\angle QAB = \angle PAB \quad (l$ is bisector)

$\triangle APB \cong \triangle AQB$ (by AAS rule)

$\therefore BQ = BP$ (by CPCT)

6. In figure shown, $AC = AE, AB = AD$ and $\angle BAD = \angle CAE$. Show that $BC = DE$.

Solution:

Given,

$AB = AD, AC = AE$ and

$\angle BAD = \angle CAE$

Now,

$\angle EAC + \angle DAC = \angle BAD + DAC \quad (\angle DAC$ is common)

Now in $\triangle DAE$ and $\triangle BAC$

$AD = AB$

$\angle DAE = \angle BAC$
AE = AC
\[\Delta DAF \cong \Delta BAC \text{(by SAS rule)}.\]
DE = BC \text{(by CPCT)}.

7. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that \(\angle BAD = \angle ABE \) and \(\angle EPA = \angle DPB\) as shown in figure. Show that
(i) \(\Delta DAP \cong \Delta EBP\)
(ii) \(AD = BE\)

**Solution:**

Given,
\[\angle DPB = \angle EPA\]
\[\Rightarrow \angle DPB + \angle DPE = \angle EPA + \angle DPE\]
\[\Rightarrow \angle DPA = \angle EPB\]
In \(\Delta DAP\) and \(\Delta EBP\)
\[\angle DAP = \angle EBP \text{(given)}\]
AP = BP \text{(P is mid-point of AB)}
\[\angle DPA = \angle EPB \text{(from above)}\]
\[\therefore \ \Delta DAP \cong \Delta EBP \text{ (ASA)}\]
BE = AD \text{(by CPCT)}

8. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B as shown in figure. Show that
(i) \(\Delta BMD \cong \Delta AMC\)
(ii) \(\angle DBC\) is a right angle.
(iii) \(\Delta DBC \cong \Delta ACB\)
(iv) \( CM = \frac{1}{2} AB \)

Solution:

(i) In \( \triangle BMD \) and \( \triangle AMC \)
- \( BM = AM \) (\( M \) is mid-point)
- \( \angle BMD = \angle AMC \) (vertically opposite angles)
- \( DM = CM \) (given)
- \( \triangle BMD \cong \triangle AMC \) (by SAS rule)
- \( BD = AC \) (by CPCT)
- \( \angle BDM = \angle ACM \) (by CPCT)

(ii) Given,
- \( \angle BDM = \angle ACM \) (alternate interior angles)
- \( DB \parallel AC \) (alternate angles are equal)
- \( \Rightarrow \angle DBC + \angle ACB = 180^\circ \)
- \( \Rightarrow \angle DBC + 90^\circ = 180^\circ \) (co-interior angles)
- \( \Rightarrow \angle DBC = 90^\circ \)

(iii) Now in \( \triangle DBC \) and \( \triangle ACB \)
- \( DB = AC \) (proved)
- \( \angle DBC = \angle ACB \) (90°)
- \( CB = BC \) (common)
- \( \triangle DBC \cong \triangle ACB \) (by SAS rule)

(iv) We have, \( \triangle DBC \cong \triangle ACB \)
- \( AB = DC \) (by CPCT)
- \( \Rightarrow AB = 2 \text{ CM} \)
CM = \frac{1}{2} AB

Exercise: 7.2

1. In an isosceles triangle $ABC$, with $AB = AC$, the bisectors of $\angle B$ and $\angle C$ intersect each other at $O$. Join $A$ to $O$. Show that:

   (i) $OB = OC$

   (ii) $AO$ bisects $\angle A$

**Solution:**

(i) Given,

   $AB = AC$

   $\Rightarrow \angle ABC = \angle ACB$ (angle opposite to equal sides of a triangle are equal)

   $\Rightarrow \frac{1}{2} \angle ACB = \frac{1}{2} \angle ABC$

   $\Rightarrow \angle OBA = \angle OCA$

   $OA = OA$

   $\triangle OAB \cong \triangle OAC$ (by SAS)

   $OB = OC$ (by CPCT)
(ii) In \( \triangle OAB \) and \( \triangle OAC \)

- \( AO = AO \) (common)
- \( AB = AC \) (given)
- \( OB = OC \) (proved)

\( \therefore \) \( \triangle OAB \cong \triangle OAC \)

\( \Rightarrow \angle BAO = \angle CAO \)

2. In \( \triangle ABC \), \( AD \) is the perpendicular bisector of \( BC \) as shown in figure. Show that \( \triangle ABC \) is an isosceles triangle in which \( AB = AC \).

**Solution:**

In \( \triangle ADB \) and \( \triangle ADC \)

- \( AD = AD \) (common)
- \( \angle ADB = \angle ADC (90^\circ) \)
- \( BD = CD \) (\( AD \) is perpendicular bisector of \( BC \))

\( \triangle ADC \cong \triangle ADB \) (by SAS rule)

\( AB = AC \) (by CPCT)

\( \therefore \triangle ABC \) is an isosceles triangle being which \( AB = AC \)

3. \( \triangle ABC \) is an isosceles triangle in which altitudes \( BE \) and \( CF \) are drawn to equal sides \( AC \) and \( AB \) respectively as shown in figure. Show that these altitudes are equal.
Solution:
In $\triangle AFC$ and $\triangle AEB$

$\angle AFC = \angle AEB$.  $(90^\circ)$
$\angle A = \angle A$  (common)
$AC = AB$  (given)
$\triangle AFC \cong \triangle AEB$ (by AAS rule)
$\Rightarrow BE = CF$

4. $ABC$ is a triangle in which altitudes $BE$ and $CF$ to sides $AC$ and $AB$ are equal as shown in figure. Show that

(i) $\triangle AFC \cong \triangle AEB$

(ii) $AB = AC$, i.e $ABC$ is an isosceles triangle.

Solution:

(i) In $\triangle AFC$ and $\triangle AEB$

$\angle AFC = \angle AEB$  $(90^\circ)$
$\angle A = \angle A$  (common)
CF = BE \hspace{1cm} \text{(given)}\\
\Delta AFC \cong \Delta AEB \hspace{1cm} \text{(by AAS rule)}\\
(ii) \Delta AFC \cong \Delta AEB\\
\Rightarrow AB = AC \hspace{1cm} \text{(CPCT)}\\

5. ABC and DBC are two isosceles triangles on the same base BC as shown in the figure. Show that \angle ABD = \angle ACD\\

\text{Solution:}\\
We join AD.\\
In \Delta ACD and \Delta ABD\\
AC = AB \hspace{0.5cm} \text{(given)}\\
DC = BD \hspace{0.5cm} \text{(given)}
AD = AD (common)

\[ \triangle ABD \cong \triangle ACD \] (by SSS rule)

\[ \Rightarrow \angle ABD = \angle ACD \] (by CPCT)

6. \( \triangle ABC \) is an isosceles triangle in which \( AB = AC \). Side \( BA \) is produced to \( D \) such that \( AD = AB \) as shown in figure. Show that \( \angle BCD \) is a right angle.

**Solution:**

In \( \triangle ABC \)

AC = AB (given)

\[ \angle ABC = \angle ACB \] (angles opposite to equal sides of a triangle are also equal)

Now, in \( \triangle ACD \)

AD = AC

\[ \Rightarrow \angle ACD = \angle ADC \] (angles opposite to equal sides of a triangle are equal)

Now, in \( \triangle BCD \)

\[ \angle ABC + \angle BCD + \angle ADC = 180^\circ \] (angle sum property)

\[ \Rightarrow \angle ACB + \angle ACB + \angle ACD + \angle ADC = 180^\circ \]

\[ \Rightarrow 2(\angle ACB + \angle ACD) = 180^\circ \]

\[ \Rightarrow 2\angle BCD = 180^\circ \]
7. ABC is a right angled triangle in which $\angle A = 90^\circ$ and $AB = AC$. Find $\angle B$ and $\angle C$.

Solution:

$\angle B = \angle C$ (angles opposite to equal sides are also equal)

In $\triangle ABC$,

$\angle A + \angle B + \angle C = 180^\circ$ (angle sum property of triangle)

$\Rightarrow \angle B + \angle B + 90^\circ = 180^\circ$ (LC = LB)

$\Rightarrow 2\angle B = 90^\circ$

$\Rightarrow \angle B = 45^\circ$

i.e. $\Rightarrow \angle B = \angle C = 45^\circ$

8. Show that the angles of an equilateral triangle are 60° each.

Solution:

Since triangle is an equilateral triangle are equal.

$\angle A = \angle B = \angle C$

$\angle A + \angle B + \angle C = 180^\circ$ (angle sum property of a triangle)

$\Rightarrow 3\angle A = 180^\circ$

$\Rightarrow \angle A = 60^\circ$

$\therefore \angle A = \angle B = \angle C = 60^\circ$

Exercise: 7.3
1. \( \triangle ABC \) and \( \triangle DBC \) are two isosceles triangles on the same base \( BC \) and vertices \( A \) and \( D \) are on the same side of \( BC \) as shown in figure. If \( AD \) is extended to intersect \( BC \) at \( P \), show that

![Diagram of triangles]

(i) \( \triangle ABD \cong \triangle ACD \)

(ii) \( \triangle ACP \cong \triangle ABP \)

(iii) \( AP \) bisects \( \angle A \) as well as \( \angle D \).

(iv) \( AP \) is the perpendicular bisector of \( BC \).

**Solution:**

(i) In \( \triangle ACD \) and \( \triangle ABD \)

\[ AC = AB \text{ (given)} \]
\[ CD = BD \text{ (given)} \]
\[ AD = AD \text{ (common)} \]

\[ \therefore \triangle ABD \cong \triangle ACD \] (by SSS rule)

\[ \Rightarrow \angle BAP = \angle CAP \] (by CPCT)

(ii) In \( \triangle ACP \) and \( \triangle ABP \)

\[ AC = AB \text{ (given)} \]
\[ \angle CAP = \angle BAP \]
\[ AP = AP \text{ (common)} \]

\[ \therefore \triangle ACP \cong \triangle ABP \] (by CPCT)(2)

(iii) \( \angle CAP = \angle BAP \)

Hence, \( AP \) bisects \( \angle A \)
Now, in $\triangle CDP$ and $\triangle BDP$

- $CD = BD$ (given)
- $DP = DP$ (common)
- $CP = BP$ (from equation (2))

$\triangle CDP \cong \triangle BDP$ (by SSS rule)

$\angle BDP = \angle CDP$ (by CPCT)

(iv) We have, $\triangle CDP \cong \triangle BDP$

$\therefore \angle CDP = \angle BDP$ (by CPCT)

Now, $\angle CPD + \angle BPD = 180^0$ (linear pair angles)

$= \angle BPD + \angle BPD = 180^0$

$= \angle BPD = 90^0$ (3)

From equations (2) and (3) we can say that $AP$ is bisector of $BC$.

2. $AD$ is an altitude of an isosceles triangle $ABC$ in which $AB = AC$. Show that

(i) $AD$ bisects $BC$

(ii) $AD$ bisects $\angle A$

\[\text{Solution:}\]

(i) In $\triangle CAD$ and $\triangle BAD$

$\angle ADB = \angle ADC(90^0$ as $AD$ is altitude)
AC = AB \quad \text{ (given)}
AD = AD \quad \text{ (common)}
⇒ \triangle CAD \cong \triangle BAD \quad \text{(by RHS rule)}
Hence, BD = CD \quad \text{(by CPCT)}
∴ AD \text{ bisects } BC

(ii) Also, by CPCT
∠BAD = ∠CAD
Hence, AD \text{ bisects } ∠A

3. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of \triangle PQR as shown in figure. Show that

(i) \triangle PQN \cong \triangle ABM
(ii) \triangle ABC \cong \triangle PQR

\text{Solution:}

(i) In \triangle ABC, AM \text{ is median to } BC
\frac{1}{2}BC = BM
In \triangle PQR, PN \text{ is median to } QR
\frac{1}{2}QR = \frac{1}{2}BC = QN
⇒ \frac{1}{2}QR = \frac{1}{2}BC \quad \text{ ....(1)}
⇒ BN = QN
Now in $\triangle PQN$ and $\triangle ABM$

$PQ = AB$  \hspace{1cm} \text{(given)}

$QN = BM$  \hspace{1cm} \text{(from equation 1)}

$PN = AM$  \hspace{1cm} \text{(given)}

$\therefore \triangle PQN \cong \triangle ABM$ \hspace{1cm} \text{(by SSS rule)}

$\angle ABM = \angle PQN$ \hspace{1cm} \text{(by CPCT)}

$\angle ABC = \angle PQR$  \hspace{1cm} (2)

(ii) Now in $\triangle ABC$ and $\triangle PQR$

$BC = QR$  \hspace{1cm} \text{(given)}

$AB = PQ$  \hspace{1cm} \text{(given)}

$\angle ABC = \angle PQR$ \hspace{1cm} \text{(from equation 2)}

$\Rightarrow \triangle ABC \cong \triangle PQR$ \hspace{1cm} \text{(by SAS rule)}

4. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

**Solution:**

In $\triangle CFB$ and $\triangle BEC$

$\angle CFB = \angle BEC$  \hspace{1cm} (90°)

$CB = BC$  \hspace{1cm} \text{(common)}

$CF = BE$  \hspace{1cm} \text{(given)}
5. ABC is an isosceles triangle with \( AB = AC \). Draw \( AP \) so that \( AP \) is perpendicular to \( BC \) and show that \( \angle B = \angle C \)

Solution:

In \( \triangle APC \) and \( \triangle APB \)

\[ \angle APC = \angle APB \quad (90^\circ) \]

\[ AC = AB \quad (\text{given}) \]

\[ AP = AP \quad (\text{common}) \]

\[ \triangle APC \cong \triangle APB \quad (\text{by RHS rule}) \]

\[ \Rightarrow \angle B = \angle C \quad (\text{CPCT}) \]

Exercise: 7.4

1. Show that in a right-angled triangle, the hypotenuse is the longest side.
Let us consider a triangle $ABC$ to be right angled triangle.

In $\triangle ABC$

$\angle A + \angle B + \angle C = 180^\circ$ (angle sum property of triangle)

$\angle A + \angle C = 90^\circ$

Hence, other two angles need to be acute.

$\angle B$ is larger in $\triangle ABC$

$\Rightarrow \angle B > \angle A$ and $\angle B > \angle C$

$\Rightarrow AC > BC$ and $AC > AB$

(In any triangle the side opposite to the larger angle is longer)

So $AC$ is the largest side in $\triangle ABC$.

But $AC$ is the hypotenuse of $\triangle ABC$.

Therefore, hypotenuse is the largest side in a right-angled triangle.

2. In figure shown below, sides $AB$ and $AC$ of $\triangle ABC$ are extended to points $P$ and $Q$ respectively. Also, $\angle PBC < \angle QCB$. Show that $AC > AB$. 
Solution:
In the given figure
\[ \angle PBC + \angle ABC = 180^\circ \] (linear)
\[ \Rightarrow \angle ABC = 180^\circ - \angle PBC \] (1)
Also,
\[ \angle ACB + \angle QCB = 180^\circ \] (linear)
\[ \angle ACB = 180^\circ - \angle QCB \] (2)
As, \( \angle PBC < \angle QCB \)
\[ \Rightarrow 180 - \angle ABC < 180^\circ - \angle ACB \]
\[ \Rightarrow \angle ABC > \angle ACB \] (from equation 1 and 2)
\[ \Rightarrow AC > AB \] (side opposite to larger side is equal)

3. In figure shown below,
\[ \angle B < \angle A \text{ and } \angle C < \angle D. \] Show that \( AD < BC \).

**Solution:**

In \( \triangle AOB \)

\[ \angle B < \angle A \]

\[ \Rightarrow AO < BO \] (side opposite to smaller angle is smaller)...

Now in \( \triangle COD \)

\[ \angle C < \angle D \]

\[ \Rightarrow OD < OC \] (side opposite to smaller angle is smaller)...

On adding equation 1 and 2

\[ AO + OD < BO + OC \]

\[ AD < BC \]

4. \( AB \) and \( CD \) are respectively the smallest and longest sides of a quadrilateral \( ABCD \) as shown in figure.

Show that \( \angle A > \angle C \) and \( \angle B > \angle D \).
**Solution:**

(i) Let's join AC

In \( \triangle ABC \)

\[ AB < BC \] (\( AB \) is the smaller side of quadrilateral \( ABCD \))

\( \therefore \angle 2 < \angle 1 \) (angle opposite to smaller side is smaller) \( \cdots (1) \)

In \( \triangle ADC \)

\[ AD < CD \] (\( CD \) is the largest side of quadrilateral \( ABCD \))

\( \therefore \angle 4 < \angle 3 \) (angle opposite to smaller side is smaller)

On adding (1) and (2) we have

\[ \angle 2 + \angle 4 < \angle 1 + \angle 3 \]

\[ \Rightarrow \angle C < \angle A \]

\[ \Rightarrow \angle A > \angle C \]

(ii) Let's join BD
In \( \triangle ABD \)

\( AB < AD \) (\( AB \) is smaller side of quadrilateral \( ABCD \))

\( \therefore \angle 8 < \angle 5 \) (angle opposite to smaller side is smaller) \( \ldots (3) \)

In \( \triangle BDC \)

\( \angle 7 < \angle 6 \) (\( CD \) is the largest side of quadrilateral \( ABCD \)) \( \ldots (4) \)

On adding equations (3) and (4)

\( \angle 8 + \angle 7 < \angle 5 + \angle 6 \)

\( \Rightarrow \angle D < \angle B \)

\( \Rightarrow \angle B > \angle D \)

5. In shown figure, \( PR > PQ \) and \( PS \) bisects \( \angle QPR \). Prove that \( \angle PSR > \angle PSQ \).

Solution:

Given \( PR > PQ \)

\( \angle PQR > \angle PRQ \) (angle opposite to larger side is larger) \( \ldots (1) \)

\( PS \) is the bisector of \( \angle QPR \)

\( \therefore \angle QPS = \angle RPS \) \( \ldots (2) \)
Now \( \angle PSR \) is the exterior angle of \( \Delta PQS \)
\[ \therefore \angle PSR = \angle PQR + \angle QPS \ldots (3) \]
Now \( \angle PSQ \) is the exterior angle of \( \Delta PRS \)
\[ \therefore \angle PSQ = \angle PRQ + \angle RPS \ldots (4) \]
Now, adding equations (1) and (2) we have
\[ \angle PQR + \angle QPS > \angle PRQ + \angle RPS \]
\[ \Rightarrow \angle PSR > \angle PSQ \text{ (using values of equation (3) and (4))} \]

6. Show that of all line segments drawn from a given point not on it, the perpendicular line segment is the shortest.

**Solution:**

In \( \Delta PNM \)
\[ \angle N = 90^\circ \]
Now, \( \angle P + \angle N + \angle M = 180^\circ \) (angle sum property of a triangle)
\[ \angle P + \angle M = 90^\circ \]
Clearly \( \angle M \) is an acute angle
\[ \therefore \angle M < \angle N \]
\[ \Rightarrow PN < PM \text{ (side opposite to smaller angle is smaller)} \]
Similarly, by drawing different line segments from $P$ to $l$ we can prove that $PN$ is smaller as comparison to then. So, we may observe that of all line segments drawn from a given point not on it, the perpendicular line segment is the shortest.

**Exercise: 7.5**

1. ABC is a triangle. Locate a point in the interior of $\angle ABC$ which is equidistant from all the vertices of $\angle ABC$

   **Solution:**

   Triangle’s circumcenter is always equidistant from all its vertices.

   Circumcenter is the point where perpendicular bisectors, of all the sides of triangles meet.

   ![Diagram](image)

   By drawing perpendicular bisectors of sides $AB$, $BC$ and $CA$ of this triangle, we can find circumcenter of $\triangle ABC$. $O$ is the point where these bisectors are meeting together. Therefore $O$ is a point which is equidistant from all the vertices of $\triangle ABC$.

2. In a triangle locate a point in its interior which is equidistant from all the sides of the triangle.

   **Solution:**

   Incenter of triangle is the point which is equidistant from all sides of a triangle.

   The intersection point of angle bisectors of interior angles of triangle is called incenter of triangle.

   ![Diagram](image)

   We can find incenter of $\triangle ABC$ by drawing angle bisectors of interior angles of this triangle.
All the angle bisectors are intersecting each other at point I. Therefore, I is equidistant from all sides of \( \triangle ABC \).

3. In a huge park, people are concentrated at three points as shown in the figure.
   A: Where there are different slides and swings for children.
   B: near which a manmade lake is situated.
   C: Which is near to a large parking and exit.

   Where should an ice-cream parlor be set up so that maximum number of persons can approach it?

\[
\text{Solution:}
\]

Ice-cream parlor must be set up at circumcenter O of \( \triangle ABC \).

In this situation maximum number of persons can approach to it. Circumcenter O of this triangle can be found by drawing perpendicular bisectors of sides of this triangle.

4. Complete the hexagonal and star shaped rangolis by filling them with as many equilaterals triangles of side 1 cm as you can. Count the number of triangles in each case. Which has more triangles?
Solution:

We may observe that hexagonal shaped rangoli is having 6 equilateral triangles in it.

Area of $\triangle OAB = \frac{\sqrt{3}}{4} \times (side)^2 = \frac{\sqrt{3}}{4} \times (5)^2$

$$= \frac{25\sqrt{3}}{4} \text{ cm}^2$$

Thus, Area of hexagonal shaped rangoly = $6 \times \frac{25\sqrt{3}}{4} = \frac{75\sqrt{3}}{2} \text{ cm}^2$

Area of equilateral triangle of side 1 cm = $\frac{\sqrt{3}}{4} \times (1)^2 = \frac{\sqrt{3}}{4} \text{ cm}^2$

Number of equilateral triangles of 1 cm side that can be filled in this hexagonal shaped rangoly = $\frac{\frac{75\sqrt{3}}{2}}{\frac{\sqrt{3}}{4}}$

$$= 150$$

Star shaped rangoli is having 12 equilateral triangles of side 5 cm in it.
Area of star shaped rangoli = $12 \times \frac{\sqrt{3}}{4} \times (5)^2 = 75\sqrt{3}$

Number of equilateral triangle of 1 cm side that can be filled in this star shaped rangoly = \[
\frac{75\sqrt{3}}{\frac{\sqrt{3}}{4}} \]

= 300

So, star shaped rangoli has more equilateral triangles in it.