ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

IMPORTANT QUESTIONS FOR SECTION C:

1- **Find the solution set by using graphically :**

$y = 3x - 5$
$x + y = 11$

Solution:

$y = 3x - 5 - - - - (1)$
$x + y = 11 \ - - - - (2)$

Put $x = 1$ in eq (1)

$Equ\ (1) \implies$

$y = 3(1) - 5$
$y = 3 - 5$
$\boxed{y = -2}$ $(1, -2)$

Put $x = 2$ in eq (1)

$Equ\ (1) \implies$

$y = 3(2) - 5$
$y = 6 - 5$
$\boxed{y = 1}$ $(2,1)$

Put $x = 3$ in eq (1)

$Equ\ (1) \implies$

$y = 3(3) - 5$
$y = 9 - 5$
$\boxed{y = 4}$ $(3,4)$

Put $x = 4$ in eq (1)

$Equ\ (1) \implies$

$y = 3(4) - 5$
$y = 12 - 5$
$\boxed{y = 7}$ $(4,7)$

x	1	2	3	4
y	-2	1	4	7

$Equ\ (2)\ \Longrightarrow$

$$x + y = 11$$
$$y = 11 - x - - - - -(3)$$

Put $x = 1$ in eq (3)

$Equ\ (3)\ \Longrightarrow$

$$y = 11 - 1$$
$$\boxed{y = 10} \quad (1,10)$$

Put $x = 2$ in eq (3)

$Equ\ (3)\ \Longrightarrow$

$$y = 11 - 2$$
$$\boxed{y = 9} \quad (2,9)$$

Put $x = 3$ in eq (3)

$Equ\ (3)\ \Longrightarrow$

$$y = 11 - 3$$
$$\boxed{y = 8} \quad (3,8)$$

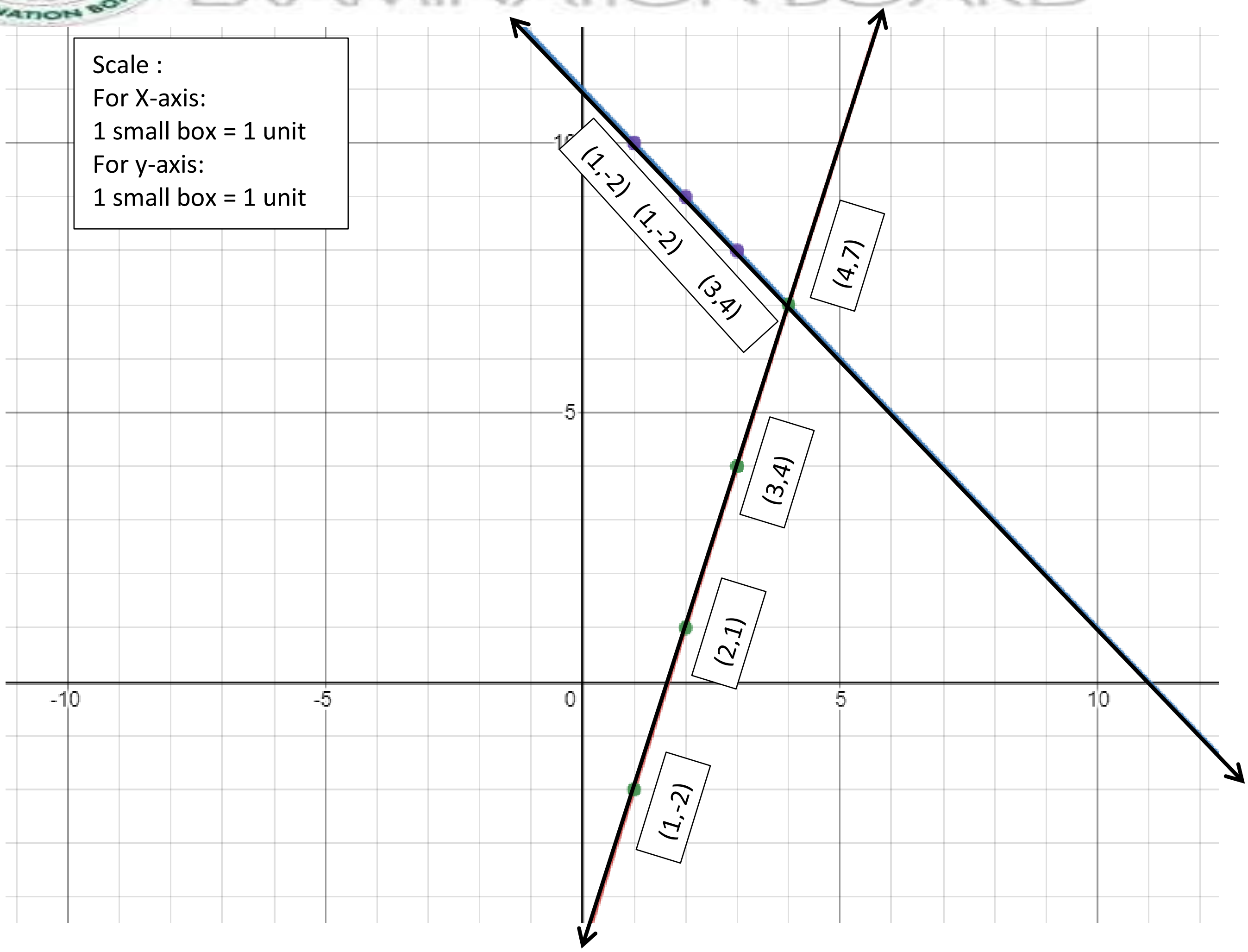
Put $x = 4$ in eq (3)

$Equ\ (3)\ \Longrightarrow$

$$y = 11 - 4$$
$$\boxed{y = 7} \quad (4,7)$$

x	1	2	3	4
y	10	9	8	7

The Solution set $= (4, 7)$



2- In any correspondence of two triangles, if one side and any two angles of one triangle are congruent to the corresponding side and angles of the other, the two triangles are congruent.

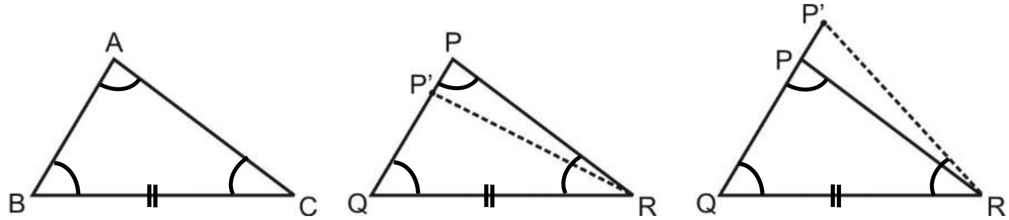
Given

In $\Delta ABC \leftrightarrow \Delta PQR$

$\overline{BC} \cong \overline{QR}$

$\angle B \cong \angle Q$

$\angle A \cong \angle P$



To Prove

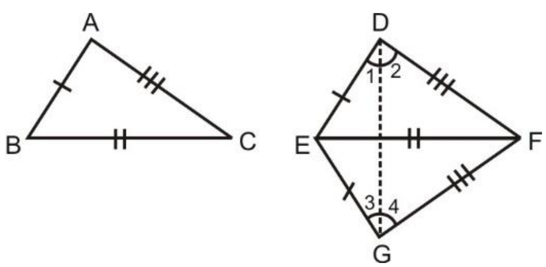
$\Delta ABC \cong \Delta PQR$

Proof

#	Statements	Reasons
1.	In $\Delta ABC \leftrightarrow \Delta PQR$ (i) $\angle A \cong \angle P$ (ii) $\angle B \cong \angle Q$	 (i) Given. (ii) Given.
2.	$\therefore \angle C \cong \angle R$	By Theorem 5, Corollary 6.
3.	If $\overline{BA} \ncong \overline{QP}$, take a point P' on $\overline{QP}$ (or $\overline{OP}$ produced) such that: $\overline{QP} \cong \overline{BA}$	Assumption.
4.	In $\Delta ABC \leftrightarrow \Delta P'QR$ (i) $\overline{BC} \cong \overline{QR}$ (ii) $\angle B \cong \angle Q$ (iii) $\overline{BA} \cong \overline{QP'}$	 (i) Given. (ii) Given. (iii) By supposition.
5.	So, $\Delta ABC \cong \Delta P'QR$	S.A.A. Postulate.
6.	$\therefore \angle C \cong \angle QRP'$	By the congruence of triangles.
7.	But $\angle C \cong \angle QRP$	By (2)
8.	$\therefore \angle QRP \cong \angle QRP$	Transitive property.
9.	This is possible only when points P' and P coincide and $\overline{RP'} \cong \overline{RP}$.	By angle construction postulate.
10.	Hence $\overline{BA} \cong \overline{QP}$	As P and P' coincide.
11.	In $\Delta ABC \leftrightarrow \Delta PQR$ (i) $\overline{BC} \cong \overline{QR}$ (ii) $\angle B \cong \angle Q$ (iii) $\overline{BA} \cong \overline{QP}$	 (i) Given. (ii) Given. (iii) By (10)
12.	Hence $\Delta ABC \cong \Delta PQR$	S.A.A. Postulate.

Q. E. D.

3- In a correspondence of two triangles, if three sides of one triangle are congruent to the corresponding three sides of the other, the two triangles are congruent. ($S.S.S. \cong S.S.S.$)



Given

In $\Delta ABC \leftrightarrow \Delta DEF$

$\overline{AB} \cong \overline{DE}$

$\overline{BC} \cong \overline{EF}$

$\overline{CA} \cong \overline{FD}$

To Prove

$\Delta ABC \cong \Delta DEF$

Construction

Construct ΔGEF such that:

(i) Point G is on the opposite side of point D.
(ii) $\angle FEG \cong \angle B$
(iii) $\overline{EG} \cong \overline{AB}$

Join G and D.

Proof

#	Statements	Reasons
1.	In $\Delta ABC \leftrightarrow \Delta GEF$ (i) $\overline{BC} \cong \overline{EF}$ (ii) $\angle B \cong \angle GEF$ (iii) $\overline{BA} \cong \overline{GE}$	 (i) Given. (ii) Construction. (iii) Construction.
2.	So, $\Delta ABC \cong \Delta GEF$	S.A.S. Postulate.
3.	$\therefore \overline{AC} \cong \overline{GF}$ and $\angle A \cong \angle G$	By the congruence of triangles.
4.	But $\overline{DF} \cong \overline{AC}$	Given.
5.	$\therefore \overline{GF} \cong \overline{DF}$	Transitive Property.
6.	$\therefore$ In ΔDEG, $m\angle 1 = m\angle 3$	$\overline{EG} \cong \overline{BA} \cong \overline{ED}$ (Theorem 6).
7.	Similarly, in ΔGFD, $m\angle 2 = m\angle 4$	$\overline{DF} \cong \overline{GF}$ (Theorem 6).
8.	$\therefore m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	Addition property of equation.
9.	Or $m\angle D = m\angle G$	$m\angle 1 + m\angle 2 = m\angle D$ and $m\angle 3 + m\angle 4 = m\angle G$
10.	But $m\angle G = m\angle A$	By (3).
11.	$\therefore m\angle A = m\angle D$	Transitive Property.
12.	In $\Delta ABC \leftrightarrow \Delta DEF$ (i) $\overline{AB} \cong \overline{DE}$ (ii) $\angle A \cong \angle D$ (iii) $\overline{AC} \cong \overline{DF}$	 (i) Given. (ii) By (11). (iii) Given.
13.	So, $\Delta ABC \cong \Delta DEF$	S.A.S. Postulate.

4- Draw a circle of radius 2.5 cm. take a point B at a distance of 6.5 cm from the centre of a circle and draw two tangents to the circle passing through B. find the length of the segments of tangents by measuring them. Verify your measurement with the help of the Pythagoras theorem.

Solution :

(a) Draw a circle of radius = 2.5cm with O as a centre.

(b) Take a point B at a distance of 6.5 cm from the centre O of the circle.

(c) Join the points B and O to draw $\overline{OB} = 6.5\ cm.$

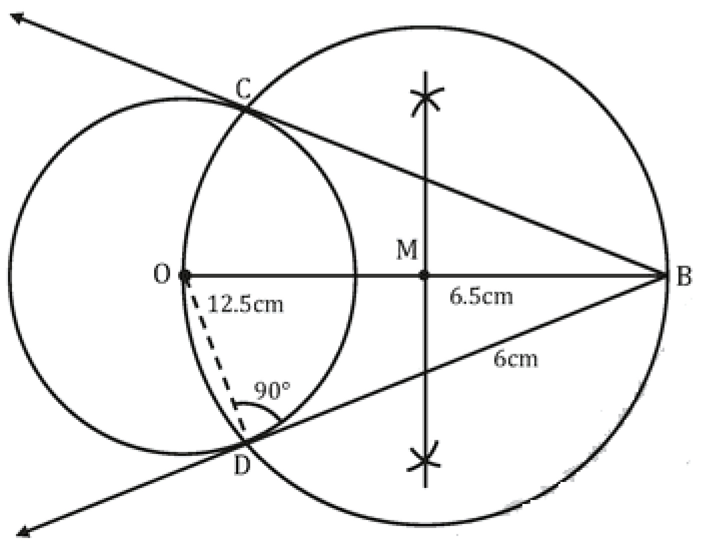
(d) Bisect the line segments $\overline{OB}\ at\ M.$

(e) Take M as a centre and $dius = m\overline{BM}\ or\ m\overline{OB}$, draw a circle intersecting the given circle at point C and D.

(f) Join B to C and extend it.

(g) Join B to D and extend it.

Hence BC and BD are the required tangents to the given circle from the point B outsides the circle.



The length of the segments of tangents is 6.0 cm

Verification by Pythagoras theorem ΔABC is a right triangle in which :

$\angle ODB = 90°$

Hypotenuse $\overline{OB} = 6.5cm$

Side $\overline{OD} = 2.5cm$

Side $\overline{BD} = 6.0cm$

So,

$(\overline{OB})^2 = (\overline{OD})^2 + (\overline{BD})^2$

$(6.5)^2 = (2.5)^2 + (6.0)^2$

$42.5 = 6.25 + 36.0$

$\boxed{42.5 = 42.5}$

Hence Proved

5- Take two circles of radii 3 cm , having the distance between their centres equal to 9cm. draw the transverse common tangents to these circles. Measure the line segments joining their points of contact.

Solutions :

(a) Draw two circles of radii 3 cm having the distance between their centres = 9cm.

(b) With centre A draw a big circle having radius 3+3=6 cm.

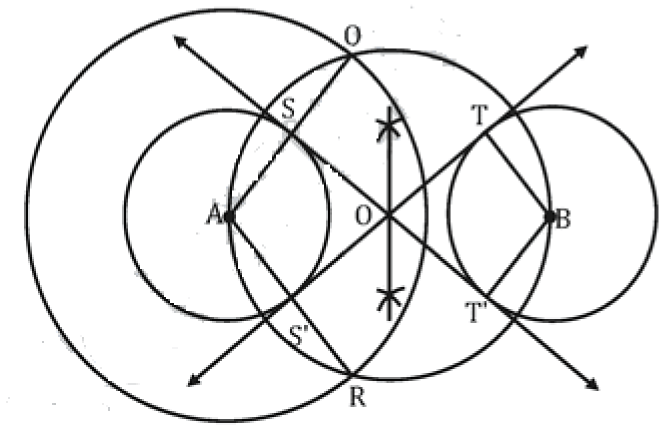
(c) Join A and B.

(d) Bisect $\overline{AB}\ at\ O$.

(e) With O as a centre and $radius = m\overline{OA}\ or\ m\overline{OB}$, $draw$ a circle intersecting the big circle at Q and R.

(f) Join A to Q . intersecting the given circle with centre A at S.

(g) Draw radius $\overline{BT}$ of the second circle parallel to $\overline{AQ}$ but in the opposite sense.



(h) Join S and T and extend it on either sides.

(i) Similarly draw other transverse common tangents $\overleftrightarrow{S'T}$.

Hence $\overleftrightarrow{ST}$ and $\overleftrightarrow{S'T}$ are the required transverse. Common tangents to the two given circles. The measure of the line segments joining their point of contact $S\ and\ T\ and\ S'and\ T' = 6.7cm$.