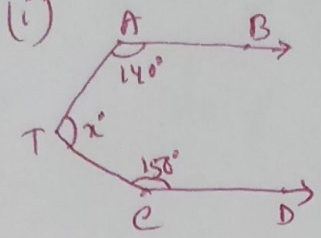
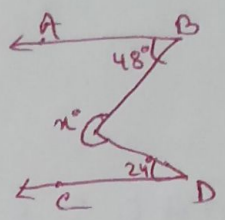
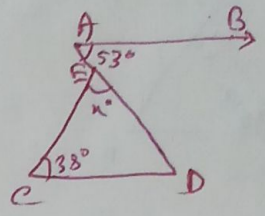
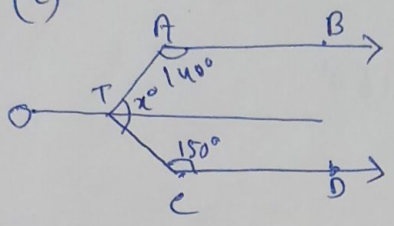
Exercise - 4.1

1 In the figure, AB is parallel to ED, find x.

(i) 

(ii) 

(iii) 

⇒ (i) 

This figure, $\angle OTE = \angle TED$ and $\angle OTA = \angle TAB$

$\angle OTE = 150°$ $\angle OTA = 140°$

Now, $\angle ATE$.

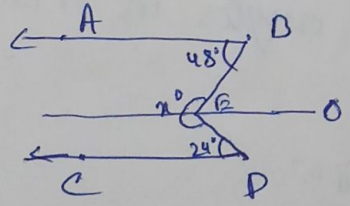
Now, $\angle ATE = 360° - (\angle OTA + \angle OTE)$

$= 360° - (150 + 140)$

$= 360° - 290°$

$= 70°$.

Therefore $\angle x = 70°$

(ii) 

This figure, $\angle OED = \angle EDC$ and $\angle OEB = \angle ABC$

$\angle OED = 24°$ $\angle OEB = 48°$

Now, $x° = 360° - (\angle OEB + \angle OED)$

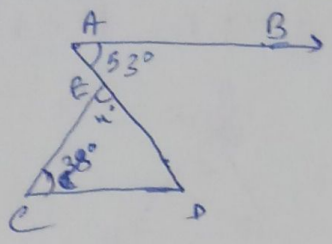
$x° = 360° - (48° + 24°)$

$= 360° - 72°$

$= 288$

Thus, the value of $x° = 288°$.

(iii)



Now, This figure, $\angle BAD = \angle EDE$

$\angle EDE = 53°$

Now, $\triangle ECD$

$\angle CED + \angle ECD + \angle EDC = 180°$

$x + 38° + 53° = 180°$

$x = 180° - (38 + 53)°$

$x = 180° - 91°$

$x = 89°$

Therefore, the value of $x = 89°$.

(2) The angles of a triangle are in the ratio 1:2:3, find the measure of each angle of the triangle.

⇒ Let the angle are x, $2x$ and $3x$.

we know that, sum of all angles in triangle be 180°.

then, $\angle x + \angle 2x + \angle 3x = 180°$

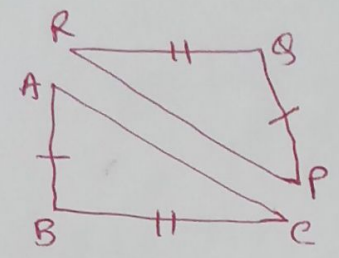
$6x = 180°$

$x = 30°$

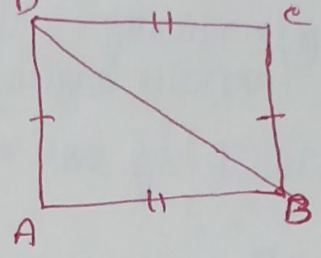
Therefore the angle of the triangle are, 30°, 60° and 90°

(3) Consider the given pairs of triangles and say whether each pair is that of congruent triangles. If the triangles are congruent, say "how"; if they are not congruent say "why". and also say if a small modification would make them congruent:

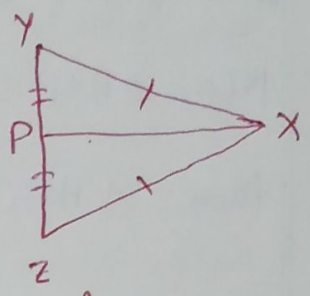
(i)



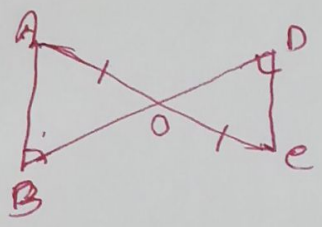
(ii)



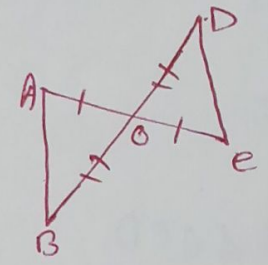
(iii)



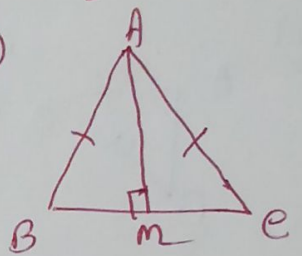
(iv)



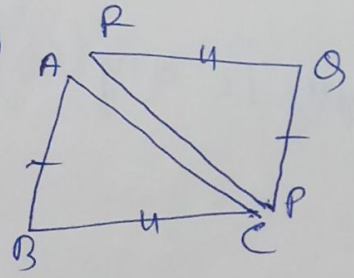
(v)



(vi)

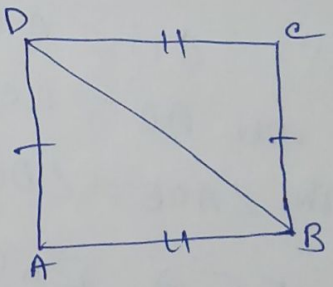


Ans (i)



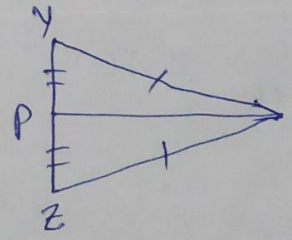
Given, $RS = BC$
and $PS = AB$.
then, $\triangle ABC$ and $\triangle PSR$ is not congruent.
if $AC = PR$, then
$\triangle ABC \cong \triangle PSR$ [by SSS Rule]

(ii)



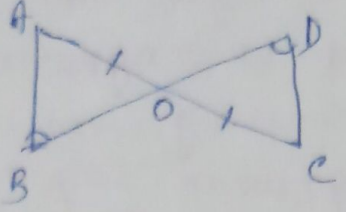
Given, $AB = DC$,
and $BC = AD$.
Now, BD is common.
So $\triangle ABD \cong \triangle BCD$
[by SSS Rule]

(iii)



Given, $PY = PZ$.
and $YX = XZ$.
Now, PX is common side.
then, $\triangle PXY \cong \triangle PXZ$ [by SSS Rule]

(iv)



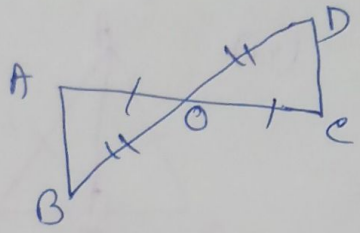
Given, $AO = OC$

and $\angle B = \angle D$.

Now, $\angle AOB = \angle AOB$ [vertically opposite Angles]

then, $\triangle ABO \cong \triangle OCD$ [by SAS Rule]

(v)



Given, $\triangle ABO$ and $\triangle OCD$.

then, $OB = OD$

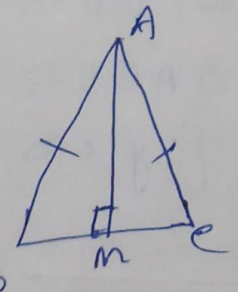
and $AO = OC$

Now, $\angle AOB = \angle DOC$ [vertically opposite angles]

By SSA Rule,

$\triangle ABO \cong \triangle OCD$.

(vi)



Given $\triangle ABM$ and $\triangle AMC$

then, $AB = AC$ ~~and~~.

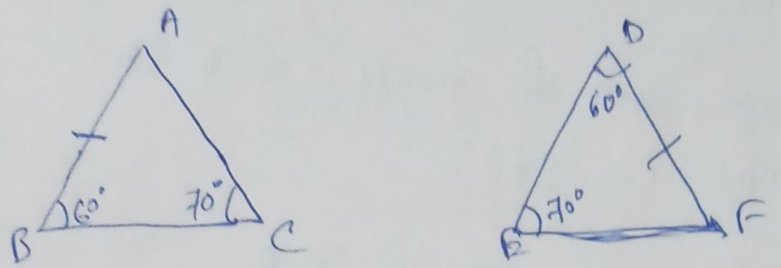
$BM = MC$ [$\because AM$ is the median of the $\triangle ABC$]

AM is common side.

By SSS Rule, $\triangle ABM \cong \triangle ABC$.

(4) $\triangle ABC$ and $\triangle DEF$ are two triangles in which $AB = DF$, $\angle ACB = 70°$, $\angle ABC = 60°$, $\angle DEF = 70°$ and $\angle EDF = 60°$.
Prove that the triangle are congruent.

⇒



Given $\triangle ABC$ and $\triangle DEF$.

then, $AB = DF$.

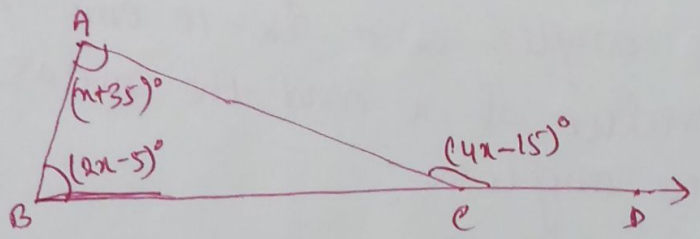
$\angle ABC = \angle EDF = 60°$

and $\angle ACB = \angle DEF = 70°$

By SAA Rule, $\triangle ABC$ and $\triangle DEF$ are congruent.

$\therefore \triangle ABC \cong \triangle DEF$. [Proved]

(5) Find all the three angles of the $\triangle ABC$



We know that, exterior angle = two opposite interior angles.

Now, $(4x - 15) = (x + 35) + (2x - 5)$

$4x - 15 = x + 2x + 30$

$4x - 3x = 30 + 15 = 45$

$x = 45$

Thus,

$\angle A = (x + 35) = (45 + 35) = 80°$

$\angle B = (2x - 5) = (90 - 5) = 85°$

$\angle C = 180° - (80 + 85) = 15°$.