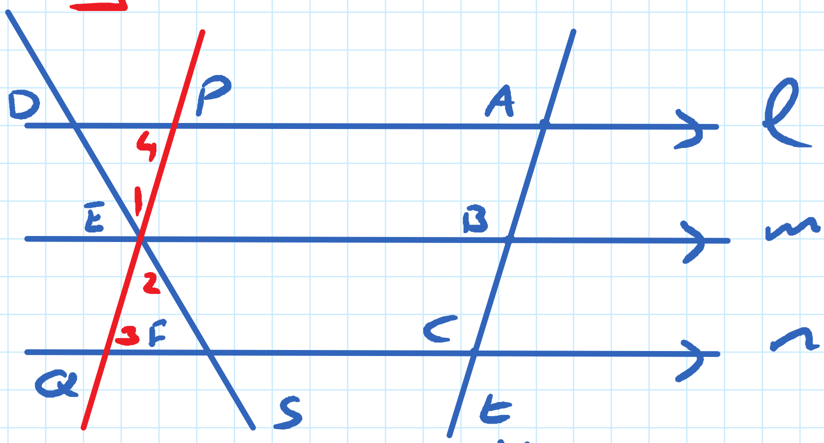
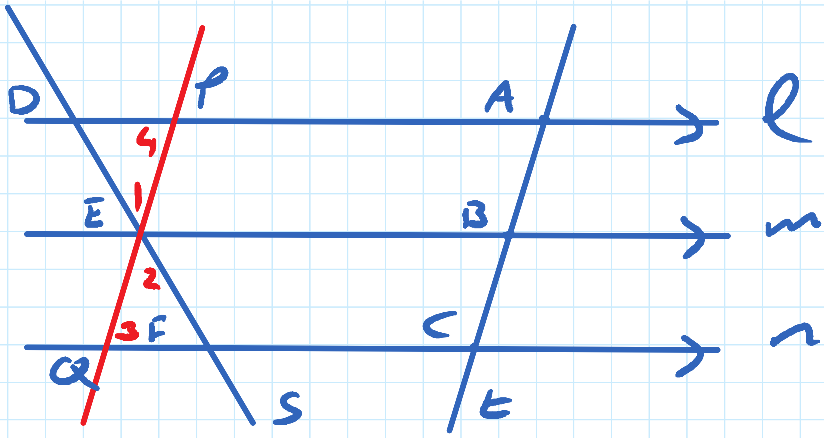
If 3 parallel lines cut equal segments on some transversal line, then they will cut off equal segments on any other transversal.



Given : 3 parallel lines, l, m and n intersect t at points A, B and C, such that |AB| = |BC|. Another transversal i.e. intersect at D, E and F.

To prove : |DE| = |EF|

Construction : Through E draw a line parallel to t intersect l at P and n at Q



Proof: $ABEP$ and $BCEQ$ are parallelograms

$|PE| = |AB|$ and $|EQ| = |BC|$

but $|AB| = |BC|$ so $|PE| = |EQ|$

$|\angle 1| = |\angle 2|$ vertically opposite

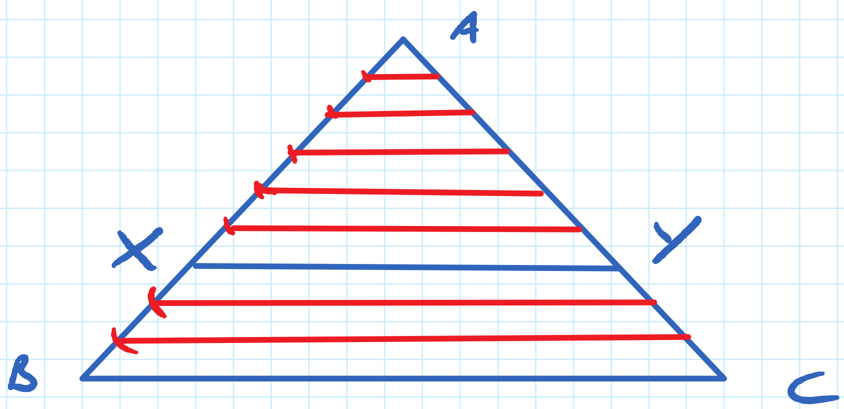
$|\angle 3| = |\angle 4|$ alternate

$|PE| = |EQ|$

$\triangle DEP \equiv \triangle FEQ$

$|DE| = |EF|$

Let ABC be a triangle.
If a line XY is parallel to BC and cuts [AB] in ratio p : q then it also cuts [AC] in same ratio.



Given : ΔABC with XY parallel to BC

To prove : $\dfrac{|AX|}{|XB|} = \dfrac{|AY|}{|YC|}$

Construction : Divide [AX] into p equal parts and (XB] into q equal parts.
Through each division draw parallel lines.

Proof . Parallel lines makes

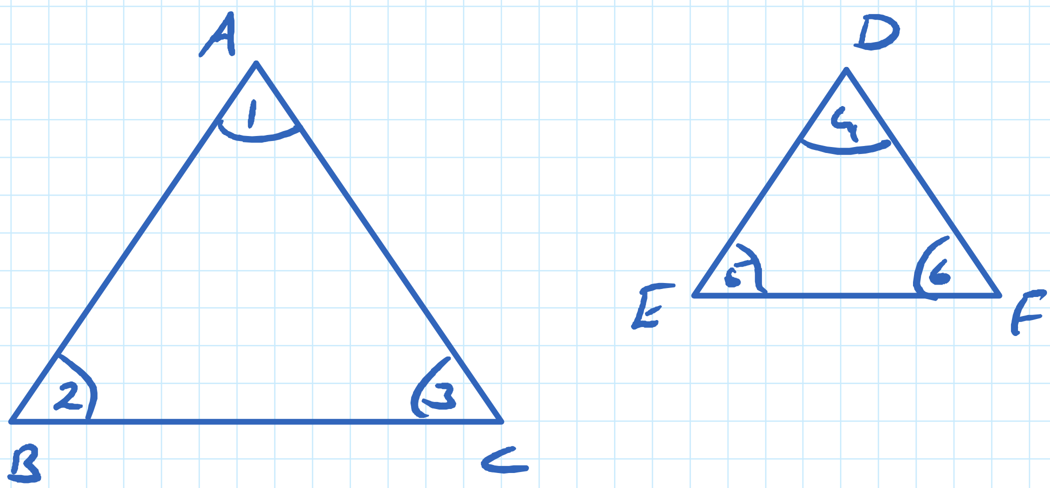
equal intercepts on [AC]
[AY] is divided into
p equal parts and
[YC] into q equal
parts.

$$\frac{|AY|}{|YC|} = \frac{p}{q} = \frac{|AX|}{|XB|}$$

$$\frac{|AY|}{|YC|} = \frac{|AX|}{|XB|}$$

If two triangles, ABC and DEF, are similar, then their sides are proportional in order

$$\frac{|AB|}{|DE|} = \frac{|BC|}{|EF|} = \frac{|AC|}{|DF|}$$



Given : $\triangle ABC$ and $\triangle DEF$

where $|\angle 1| = |\angle 4|$, $|\angle 2| = |\angle 5|$

$|\angle 3| = |\angle 6|$

To prove $\frac{|AB|}{|DE|} = \frac{|BC|}{|EF|} = \frac{|AC|}{|DF|}$

Construction :

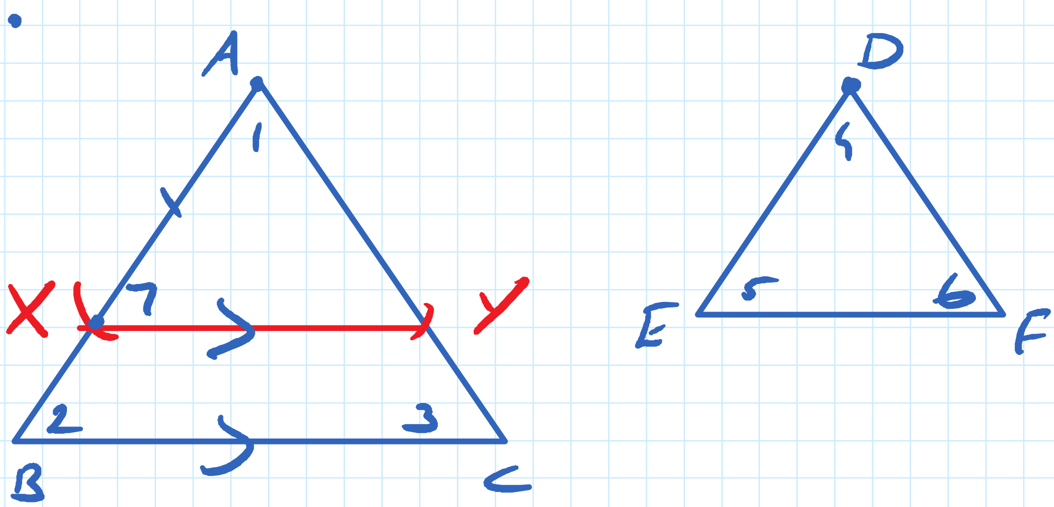
Mark the point X on $[AB]$

such that $|AX| = |DE|$

Mark the point Y on $[AC]$

such that $|AY| = |DF|$

Join X to Y



Proof. $\triangle AXY \equiv \triangle DEF$ SAS

$|\angle 5| = |\angle 7|$

$|\angle 5| = |\angle 2|$

$|\angle 7| = |\angle 2|$

$\therefore \quad |XY| \parallel |BC|$

$$\therefore \quad \frac{|AB|}{|AX|} = \frac{|AC|}{|AY|}$$

$$\frac{|AB|}{|DE|} = \frac{|AC|}{|DF|}$$

Similarly $\quad \dfrac{|AB|}{|DE|} = \dfrac{|BC|}{|EF|}$