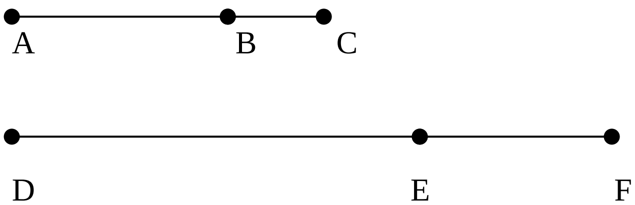
Segments Divided Proportionally

Divided proportionally:

Given line segments:

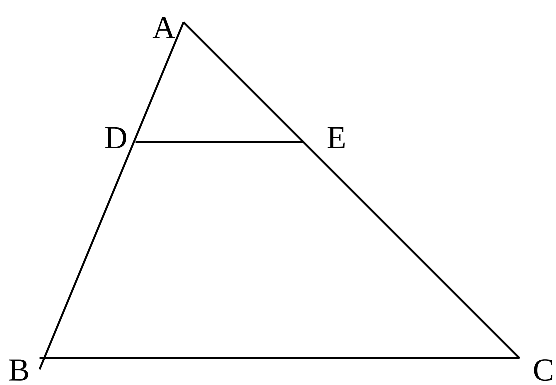


$\overline{AC}$ and $\overline{DE}$ are divided proportionally at the points B and E respectively.

$$\frac{AB}{DE} = \frac{BC}{EF} \quad \text{or} \quad \frac{AB}{BC} = \frac{DE}{EF}$$

Example 1: Use the figure form above. If AB = 5, BC = 3 and DF =7, find EF.

Theorem 5.6.1: If a line is parallel to one side of a triangle and intersects the other two sides, then it divides these sides proportionally.

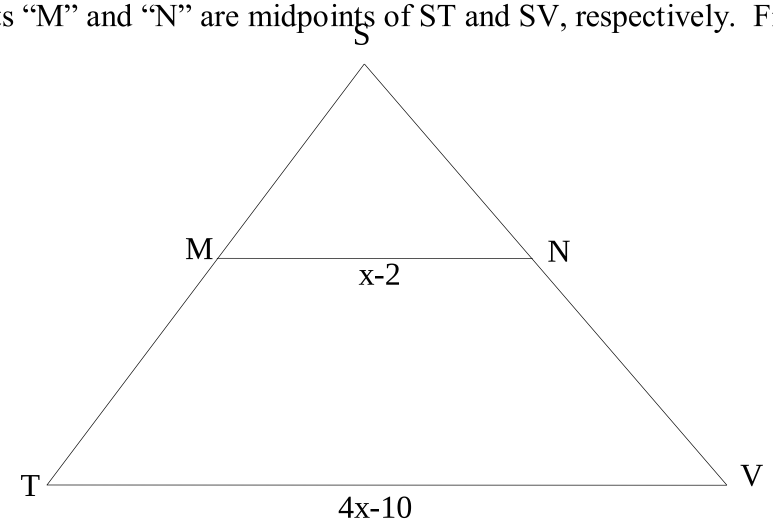


$$\mathbf{\frac{AD}{AE} = \frac{DB}{EC}}$$

Example 2: Use the figure from above. D and E divide $\overline{AB}$ and $\overline{AC}$ proportionally. If AD = 6, DB = 8 and EC = 10. Find AE.

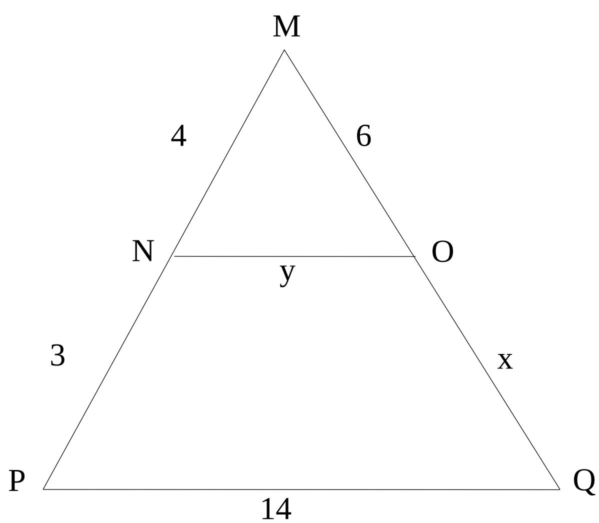
Example 3: Problem from 4.2. Notice the difference.

. Points "M" and "N" are midpoints of ST and SV, respectively. Find "x", MN, and TV.



Example 4:

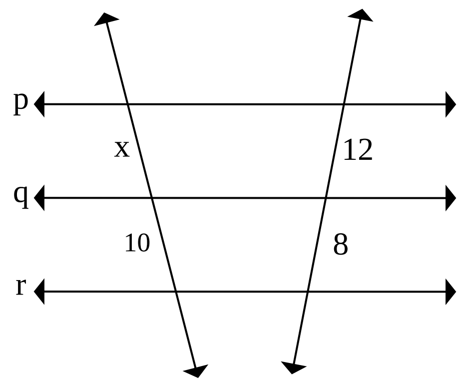
ΔMNO ~ ΔMPQ. Find the values of "x" and "y".



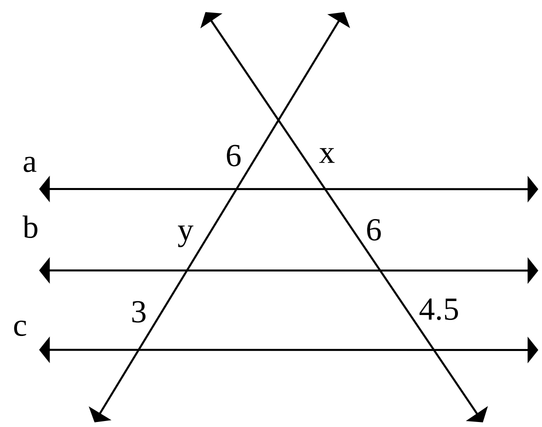
Corollary 5.6.2: when three (or more) parallel lines are cut by a pair of transversals, the transversals are divided proportionally by the parallel lines.

Example 5:

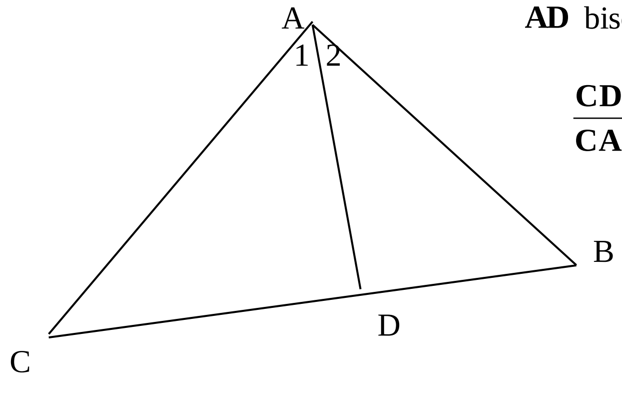
A. Find “x”. p ll q ll r.



B. Find “x” and “y”. a ll b ll c .



Theorem 5.6.3: (The Angle Bisect Theorem) If a ray bisects one angle of a triangle, then it divides the opposite side into proportional segments whose lengths are proportional to the lengths of the to sides that form the bisected angle.



$\overline{AD}$ bisects $\angle CAB$ so $m\angle 1 = m\angle 2$ then

$$\frac{CD}{CA} = \frac{BD}{AB}$$

Example 6:

ΔXYZ , **$\overline{YW}$** bisects **$\angle$XYW** , if XY = 4, YZ = 6 and XW = 3. Find WZ.

Example 7:

ΔPMN with **$\overline{MR}$** bisects **$\angle$NMP** . If MN = 2x, NR = x, RP = $x+1$ and MP = $3x-1$, find x and the measure of $\overline{MP}$, $\overline{RP}$, $\overline{MN}$, and $\overline{NR}$.