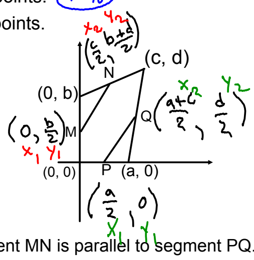
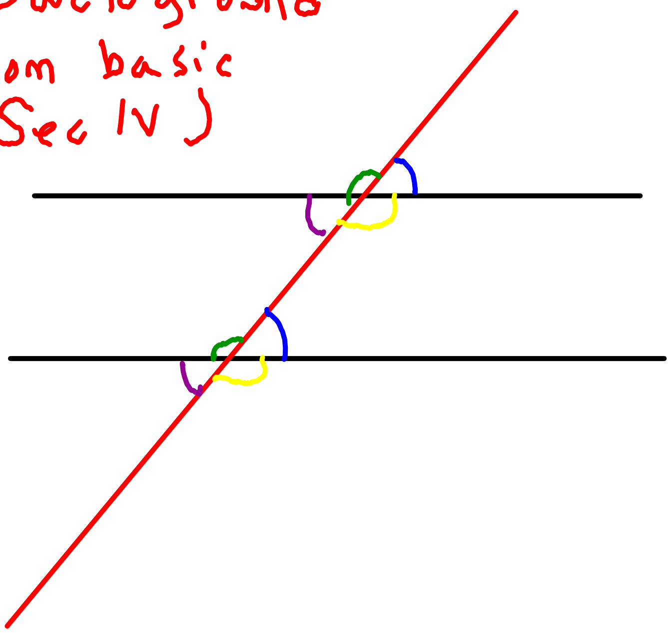
M and N are midpoints. 5%
P and Q are midpoints.



Prove that segment MN is parallel to segment PQ.

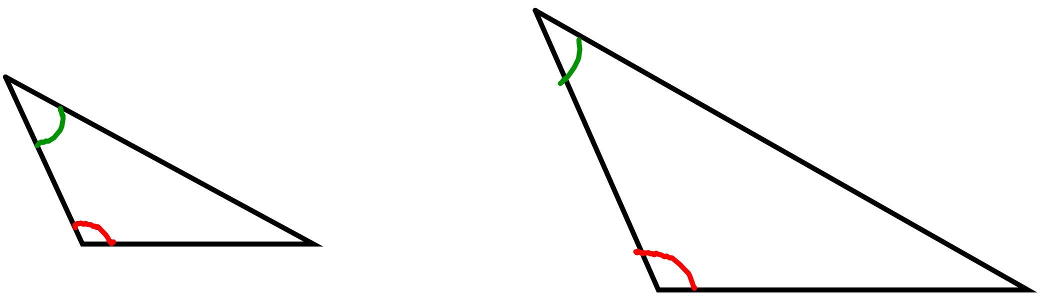
Statements	Justifications
Coordinates of M: $\left(\frac{0+0}{2}, \frac{b+0}{2}\right)$ $\left(0, \frac{b}{2}\right)$	Midpoint Formula: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$
Coordinates of N: $\left(\frac{0+c}{2}, \frac{b+d}{2}\right)$ $\left(\frac{c}{2}, \frac{b+d}{2}\right)$	The first step, written in black, will be given to you!
Coordinates of P: $\left(\frac{a}{2}, 0\right)$	
Coordinates of Q: $\frac{a+c}{2}, \frac{d}{2}$	
$m_{MN} = \dfrac{\frac{b+d}{2} - \frac{b}{2}}{\frac{c}{2} - 0}$ $m = \dfrac{\frac{d}{2}}{\frac{c}{2}}$ $m = \frac{d}{2} \div \frac{c}{2}$ $m = \frac{d}{\cancel{2}} \cdot \frac{\cancel{2}}{c}$ $\boxed{m_{MN} = \frac{d}{c}}$ $m_{PQ} = \dfrac{\frac{d}{2} - 0}{\frac{a+c}{2} - \frac{a}{2}}$ $m = \dfrac{\frac{d}{2}}{\frac{c}{2}}$ $m = \frac{d}{2} \div \frac{c}{2}$ $m = \frac{d}{\cancel{2}} \cdot \frac{\cancel{2}}{c} = \frac{d}{c}$ $\boxed{m_{PQ} = \frac{d}{c}}$	Slope formula $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
3 $\overline{MN} \parallel \overline{PQ}$	Parallel lines have the same slope.

Background
(from basic
Sec IV)



corresponding
angles
are congruent
(same measure)

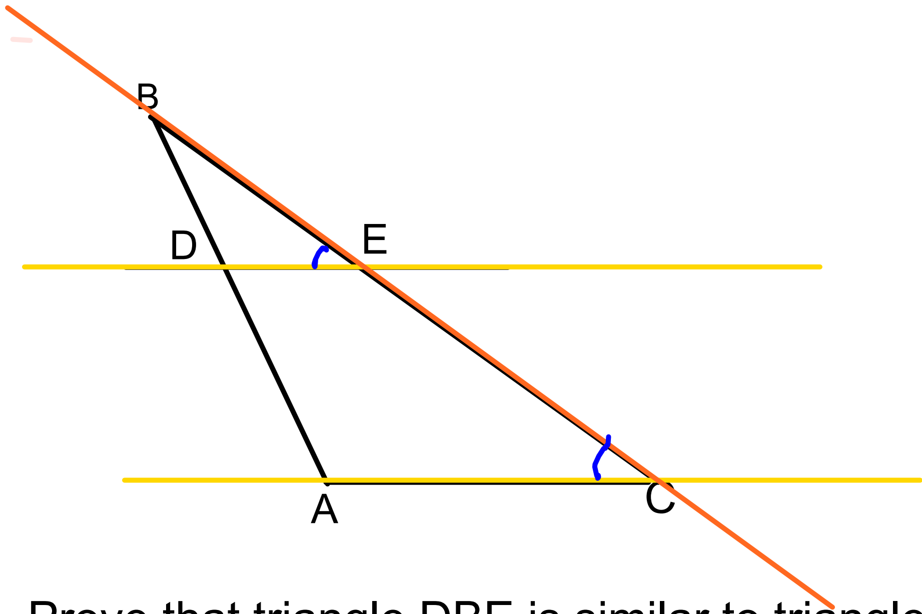
Similarity Theorems



AA theorem

If there are two sets
of congruent angles for two
triangles, then the
triangles must be similar!

Line DE is parallel to side AC.



Prove that triangle DBE is similar to triangle ABC.

	Statements	Justifications
1	$\angle DBE \cong \angle ABC$	Angle Common to both triangles
2	$\angle BED \cong \angle BCA$	Corresponding angles are congruent
3	$\triangle DBE \cong \triangle ABC$ or $\triangle DBE$ is similar to $\triangle ABC$	AA theorem