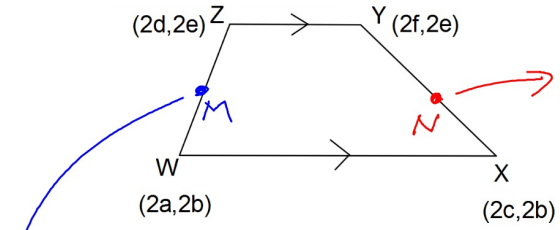
Sec 6-7: Proofs Using Coordinate Geometry

WXYZ is a Trapezoid.

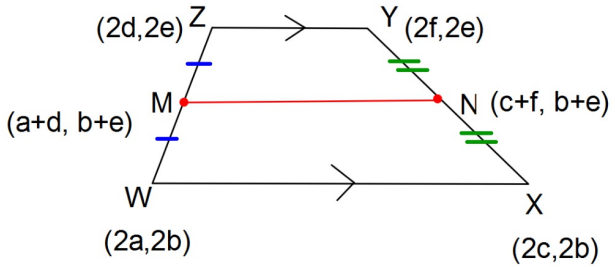


$\left(\frac{2c+2f}{2}, \frac{2b+2e}{2}\right) = (c+f, b+e)$

Find the coordinates of the midpoints of the legs. Label these points M and N.

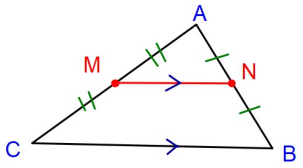
mdpt: $\left(\frac{2a+2d}{2}, \frac{2b+2e}{2}\right) = (a+d, b+e)$

What name would you give $\overline{MN}$? Midsegment



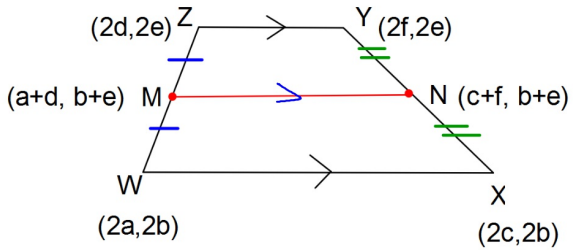
Remember From Section 5-1:

The midsegment of a triangle is formed by connecting the midpoints of two sides. It is parallel to the third side and is half its length.



$\overline{MN} \parallel \overline{BC}$

$MN = \frac{1}{2}BC$



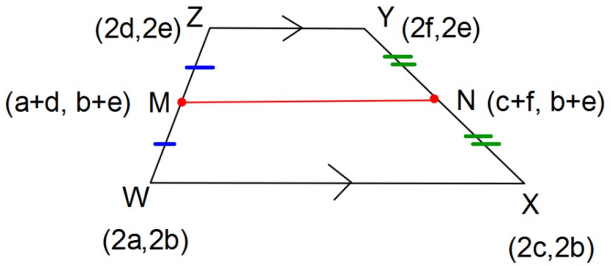
Show that $\overline{MN}$ is parallel to both $\overline{WX}$ and $\overline{ZY}$

slope of $\overline{YZ}$ $\quad m = \frac{2e-2e}{2f-2d} = \frac{0}{2f-2d} = 0$

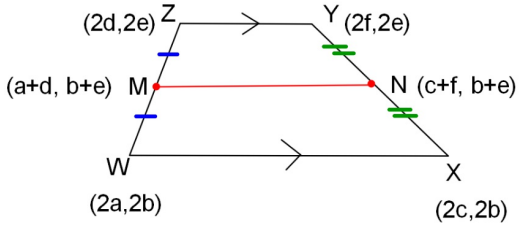
slope of $\overline{MN}$ $\quad m = \frac{(b+e)-(b+e)}{(c+f)-(a+d)} = \frac{0}{(c+f)-(a+d)} = 0$

slope of $\overline{WX}$ $\quad m = \frac{2b-2b}{2a-2c} = \frac{0}{2a-2c} = 0$

Since all three slopes are equal they are all parallel

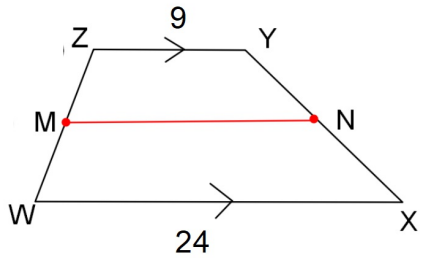


What do you think is the relationship between the length of $\overline{MN}$ and the lengths of $\overline{WX}$ and $\overline{ZY}$?



$$MN = \frac{1}{2}(WX + ZY)$$

The length of the midsegment of a trapezoid is the average of the bases.



Find the length of MN.

$MN = \frac{1}{2}(24 + 9) = \frac{33}{2} = 16.5$