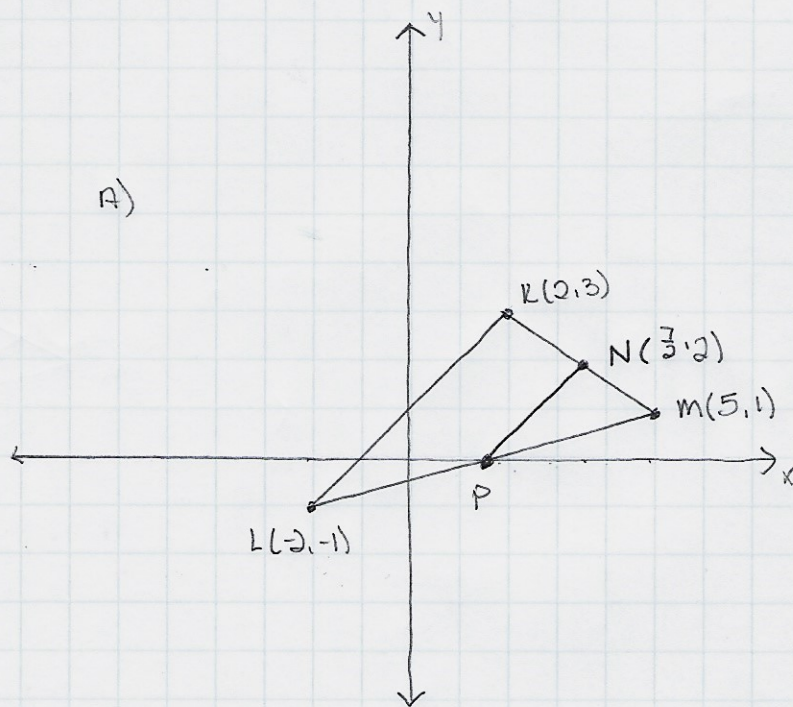


Proving Δ Midsegment Theorem:

For ΔKLM :

$K(2,3)$ $L(-2,-1)$ $M(5,1)$

w/ midpoints N and P



- B) 1) Find point N , midpoint of \overline{KM}
Find point P , midpoint of \overline{LM}

$$N\left(\frac{2+5}{2}, \frac{3+1}{2}\right) \rightarrow N\left(\frac{7}{2}, 2\right)$$

$$P\left(\frac{-2+5}{2}, \frac{-1+1}{2}\right) \rightarrow P\left(\frac{3}{2}, 0\right)$$

- 2) Find the slopes of \overline{NP} and \overline{KL}

$$\overline{NP}: m = \frac{0-2}{\frac{3}{2}-\frac{7}{2}} = \frac{-2}{-2} = 1$$

$$\overline{KL}: m = \frac{-1-3}{-2-2} = \frac{-4}{-4} = 1$$

- C) 1) $\overline{NP} \parallel \overline{KL}$ because their slopes are equal.

- 3) Find the lengths of \overline{NP} and \overline{KL} .

$$NP = \sqrt{\left(\frac{7}{2}-\frac{3}{2}\right)^2 + (2-0)^2} = \sqrt{4+4} = \sqrt{8}$$

$$KL = \sqrt{(2+2)^2 + (3+1)^2} = \sqrt{16+16} = \sqrt{32} = 2\sqrt{8}$$

- 2) $NP = \frac{1}{2}KL$ because $\sqrt{8} = \frac{1}{2}(2\sqrt{8})$

Prove for every case:

- B) 1) Find M , midpoint of \overline{QP}
Find N , midpoint of \overline{QR}

$$M\left(\frac{0-2a}{2}, \frac{2b+0}{2}\right) \rightarrow M(-a, b)$$

$$N\left(\frac{0+2c}{2}, \frac{2b+0}{2}\right) \rightarrow N(c, b)$$

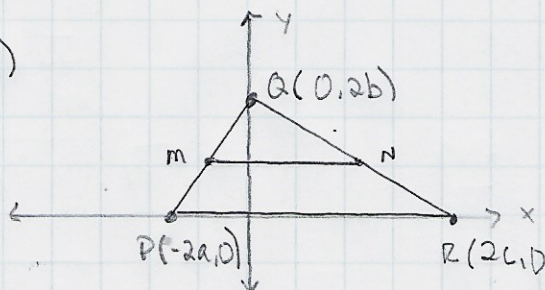
- 2) Find slopes of \overline{MN} and \overline{PR}

$$\overline{MN}: m = \frac{b-b}{-a-c} = 0$$

$$\overline{PR}: m = \frac{0-0}{-2a-2c} = 0$$

- 3) $\overline{MN} \parallel \overline{PR}$ because slopes are equal

A)



- 3) Find MN and PR .

$$MN = \sqrt{(c+a)^2 + (b-b)^2} = \sqrt{(a+c)^2} = a+c$$

$$PR = \sqrt{(2c+2a)^2 + (0-0)^2} = \sqrt{(2a+2c)^2} = 2a+2c = 2(a+c)$$

- $MN = \frac{1}{2}PR$ because $a+c = \frac{1}{2}(2)(a+c)$