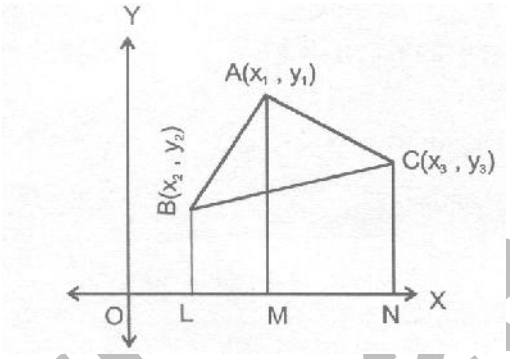
7.4 AREA OF A TRIANGLE

Let **ABC** be any triangle whose vertices are **A(x_1, y_1) B(x_2, y_3).** Draw BL, AM and CN perpendicular from B,A and C respectively, to the X-axis. ABLM, AMNC and BLNC are all trapeziums.



Area of ΔABC = Area of trapezium ABLM + Area of trapezium AMNC - Area of trapezium BLNC We know that, Area of trapezium $= \frac{1}{2}$ (Sum of parallel sides) (distance b/w them)

Therefore

Area of $\Delta ABC = \frac{1}{2}$ (BL + AM) (LM) + $\frac{1}{2}$ (AM + CN) MN- $\frac{1}{2}$ (BL + CN) (LN)

Area of $\Delta ABC = \frac{1}{2}$ $(y_2 + y_1)$ $x_1 - x_2)$ + $\frac{1}{2}$ $(y_1 + y_3)$ $(x_3 - x_1)$ - $\frac{1}{2}$ $(y_2 + y_3)$ $(x_3 - x_2)$

Area of aABC $= \frac{1}{2}\left|[x_1(y_2 - y_3) + x_2(y_3 - y\ ) + x_3(y_1 - y_2)]\right|$

(a) Condition for collinearity :

Three points **A (x_1, y_1) B(x_2, y_2) and C(x_3, y_3)** are collinear if **Area of aABC = 0.**