Name: ____________________ (      ) Class: ________

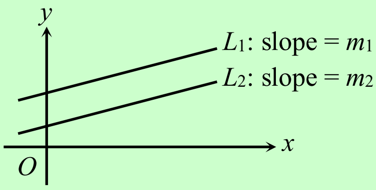
# Worksheet 10.3A

*Objective: To solve problems related to parallel lines.*

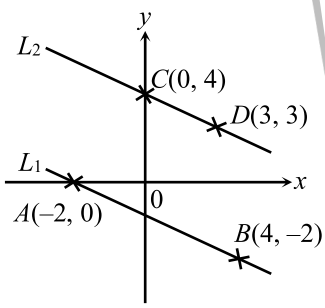
Consider two non-vertical straight lines $L_1$ and $L_2$ with slopes $m_1$ and $m_2$ respectviely.

**(1)** If $L_1 // L_2$, then $m_1 = m_2$.

**(2)** If $m_1 = m_2$, then $L_1 // L_2$.

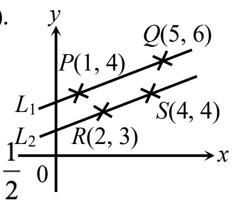



**1.** In the figure, $L_1$ is a straight line passing through the points $A(-2, 0)$ and $B(4, -2)$ while $L_2$ is a straight line passing through the points $C(0, 4)$ and $D(3, 3)$. Show that $L_1 // L_2$.




*Demonstration*

In the figure, $L_1$ is a straight line passing through the points $P(1, 4)$ and $Q(5, 6)$ while $L_2$ is a straight line passing through the points $R(2, 3)$ and $S(4, 4)$. Show that $L_1 // L_2$.




*Solution*

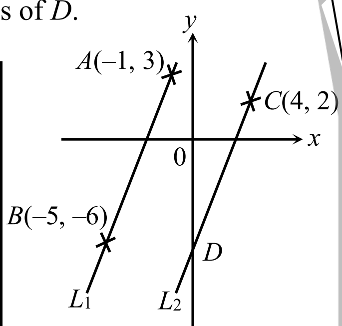
Slope of $L_1 = \dfrac{6-4}{5-1} = \dfrac{1}{2}$

Slope of $L_2 = \dfrac{4-3}{4-2} = \dfrac{1}{2}$

∵ Slope of $L_1$ = slope of $L_2$

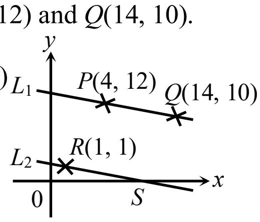
∴ $L_1 // L_2$

**2.** In the figure, $L_1$ is a straight line passing through the points $A(-1, 3)$ and $B(-5, -6)$. A straight line $L_2$ passes through the point $C(4, 2)$ and cuts the $y$-axis at $D$. If $L_1 // L_2$, find the coordinates of $D$.




*Demonstration*

In the figure, $L_1$ is a straight line passing through the points $P(4, 12)$ and $Q(14, 10)$. A straight line $L_2$ passes through the point $R(1, 1)$ and cuts the $x$-axis at $S$. If $L_1 // L_2$, find the coordinates of $S$.




*Solution*

Let $(s, 0)$ be the coordinates of $S$.

∵ $L_1 // L_2$

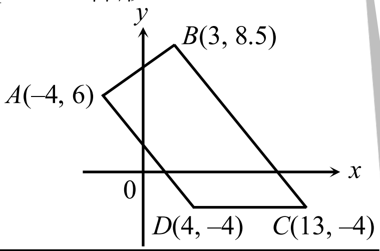
∴ Slope of $L_1$ = slope of $L_2$

$$\frac{10-12}{14-4} = \frac{0-1}{s-1}$$

$$s = 6$$

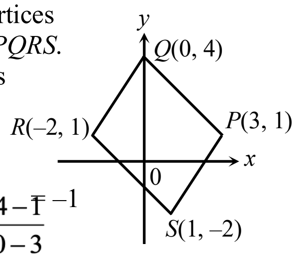
∴ The coordinates of $S$ are $(6, 0)$.

**3.** In the figure, $A(-4, 6)$, $B(3, 8.5)$, $C(13, -4)$ and $D(4, -4)$ are the vertices of a quadrilateral $ABCD$. Show that $ABCD$ is a trapezium 梯形.




*Demonstration*

In the figure, $P(3, 1)$, $Q(0, 4)$, $R(-2, 1)$ and $S(1, -2)$ are the vertices of a quadrilateral $PQRS$. Show that $PQRS$ is a parallelogram.




*Solution*

Slope of $PQ = \dfrac{4-1}{0-3} = -1$

Slope of $SR = \dfrac{1-(-2)}{-2-1} = -1$

$\because$ Slope of $PQ$ = slope of $SR$

$\therefore$ $PQ$ // $SR$

Slope of $QR = \dfrac{1-4}{-2-0} = 1.5$

Slope of $PS = \dfrac{-2-1}{1-3} = 1.5$

$\because$ Slope of $QR$ = slope of $PS$

$\therefore$ $QR$ // $PS$

$\because$ $PQ$ // $SR$ and $QR$ // $PS$.

$\therefore$ $PQRS$ is a parallelogram.

*Try More*

**4.** In the figure, $O$, $A(-15, 20)$, $B(9, 13)$ and $C(24, -7)$ are the vertices of a quadrilateral $OABC$, where $O$ is the origin. Show that $OABC$ is a rhombus 菱形.