

Point of intersection of two lines:

Keywords: point of intersection, two lines cross/intersect/meet.

Steps: 1) Find the equations of the two lines
2) Solve the system by comparison
3) Write coordinates as a point.

Ex. Find the point of intersection of lines
 $y=2x+1$ and $y=x+3$.

$$\begin{cases} y = 2x + 1 \\ y = x + 3 \end{cases}$$

$$y = y$$

$$- \quad 2x + 1 = x + 3 \quad -1$$

$$2x - x = 3 - 1$$

$$x = 2$$

$$y = 2x + 1$$

$$= 2(2) + 1$$

$$= 5$$

OPPT: $y = (2) + 3 = 5$

$$(2, 5)$$

Ex. Line 1 has equation $y=3x-1$. Line 2 passes through A(2,6) and B(5,12). Where do they meet?

① Eqn l₂:

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - 6}{5 - 2} = \frac{6}{3} = 2$$

$$y = 2x + b$$

$$6 = 2(2) + b$$

$$6 = 4 + b$$

$$2 = b$$

$$y = 2x + 2$$

② Intersection:

$$- \quad 2 \times 3x - 1 = 2x + 2 \quad +1$$

$$3x - 2x = 2 + 1$$

$$x = 3$$

$$y = 2(3) + 2 = 6 + 2 = 8$$

$$(3, 8)$$