

# Gradient and y-intercept

Equation of straight in the form of  $y = mx + c$

Where  $m$  is the gradient and the  $c$  is  $y$  intercept,

1) Find the equation of straight line where gradient and the  $y$ - intercept known.

Gradient (m)	y-intercept (c)	Equation
3	5	
-5	7	
2	-8	
$\frac{1}{2}$	6	
$-\frac{3}{4}$	$\frac{7}{8}$	

2) Find the gradient and  $y$  intercept where equation is given. Make  $y$  the subject and compare with  $y = mx + c$ .

Equation	Gradient (m)	y-intercept (c)
$y = 2 + 3x$		
$3x + 4y = 12$		
$5x - 3y = 7$		
$3x = 2y - 7$		
$x + 2y - 5 = 0$		

3) Find the gradient ( $m$ ) when two points are known.

Gradient is given by Change in  $y$ / Change in  $x$

$m = (y_2 - y_1) / (x_2 - x_1)$  Consider point A(  $x_1, y_1$ ) and B( $x_2, y_2$ )

Point A	Point B	Gradient (m)
( 5, 7)	(2,8)	
(-5,3)	(2, -5)	
(3,1)	(-3,5)	
(-7, 8)	(-5,-7)	
(-4, -3)	(2, -7)	

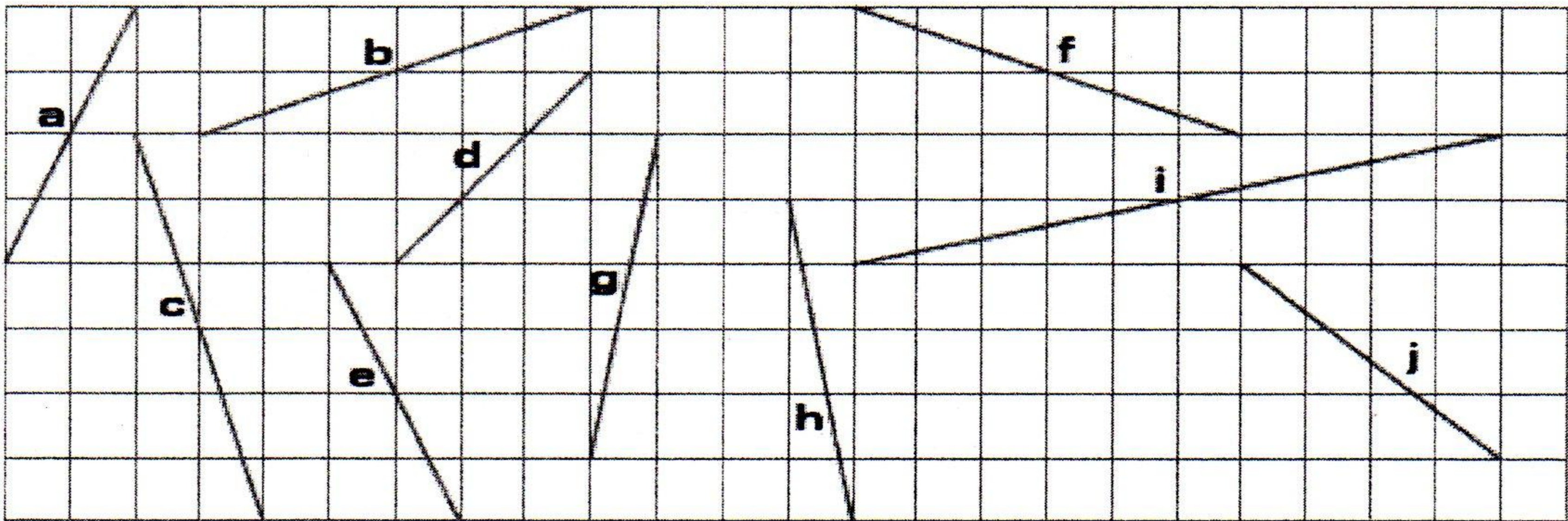
Can you find equation if gradient and  $y$  intercept are known?

Can you find gradient and  $y$  intercept if equation is known?

Can you find the gradient if two points are known?



4) Find the gradient of the following lines.



Line	a	b	c	d	e
Gradient					
Line	f	g	h	i	j
Gradient					

Finding the equation of straight line from the graph.  
 5) Find the equation of straight line. First find gradient and y intercept then use formula  $y = mx + c$ .

a)

Equation: \_\_\_\_\_

b)

Equation: \_\_\_\_\_

c)

Equation: \_\_\_\_\_

d)

Equation: \_\_\_\_\_

e)

Equation: \_\_\_\_\_

f)

Equation: \_\_\_\_\_

Can you find the gradient from the graph of straight line?

Can you find the equation of straight line from the graph?



## ***Equation of parallel and perpendicular line***

Two lines are parallel if the gradient of both lines are equal. And if the product of two gradients is equal to -1 then two lines are perpendicular

Parallel	Perpendicular
$m_1 = m_2$	$m_1 \cdot m_2 = -1$  $m_1 = -1/m_2$ $m_2 = -1/m_1$

Two lines are parallel if the gradient of both lines are equal. So there is the change in y intercept. (y-intercept is the constant term)

1) Find the gradient of parallel and perpendicular to given line.

Equation	Gradient of Parallel line	Gradient of Perpendicular line
$y = 2 + 3x$		
$3x + 4y = 12$		
$5x - 3y = 7$		
$3x = 2y - 7$		
$x + 2y - 5 = 0$		

2) Find the equation of parallel and perpendicular to given line.

Equation	Equation of Parallel line	Equation of Perpendicular line
$y = 2 + 3x$		
$3x + 4y = 12$		
$5x - 3y = 7$		
$3x = 2y - 7$		
$x + 2y - 5 = 0$		

3) Find the equation of straight line when gradient 'm' and one point known.

Equation of straight line is given by  $(y - y_1) = m(x - x_1)$

Gradient 'm'	Passes through 'B'	Equation
3	(2, 8)	
-5/2	(2, -5)	
1/2	(-3, 5)	
7/5	(-5, -7)	
-4/5	(2, -7)	

Can you find the equation of straight line if gradient and 1 point known?

Can you find the equation of parallel line to given line?

Can you find the equation of perpendicular line to given line?



4) Find the equation of straight line if 2 points are known.

Equation of straight line is given by

$$(y-y_1) = \frac{(y_2-y_1)}{(x_2-x_1)} (x-x_1) \quad \text{or} \quad (y-y_1) = m(x-x_1)$$

First find the gradient and substitute the value.

Point A	Point B	Gradient (m)	Equation
( 5, 7)	(2,8)		
(-5,3)	(2, -5)		
(3,1)	(-3,5)		
(-7, 8)	(-5,-7)		
(-4, -3)	(2, -7)		

5) Find the equation of straight line which is parallel to given line L and passes through the given point A

Parallel To line 'L'	Passes through 'A'	Equation of St. Line
$y = 2 + 3x$	( 5, 7)	
$3x + 4y = 12$	(-5,3)	
$5x - 3y = 7$	(3,1)	
$3x = 2y - 7$	(-7, 8)	
$x + 2y - 5 = 0$	(-4, -3)	

6) Find the equation of straight line which is perpendicular to given line M and passes through the given point B

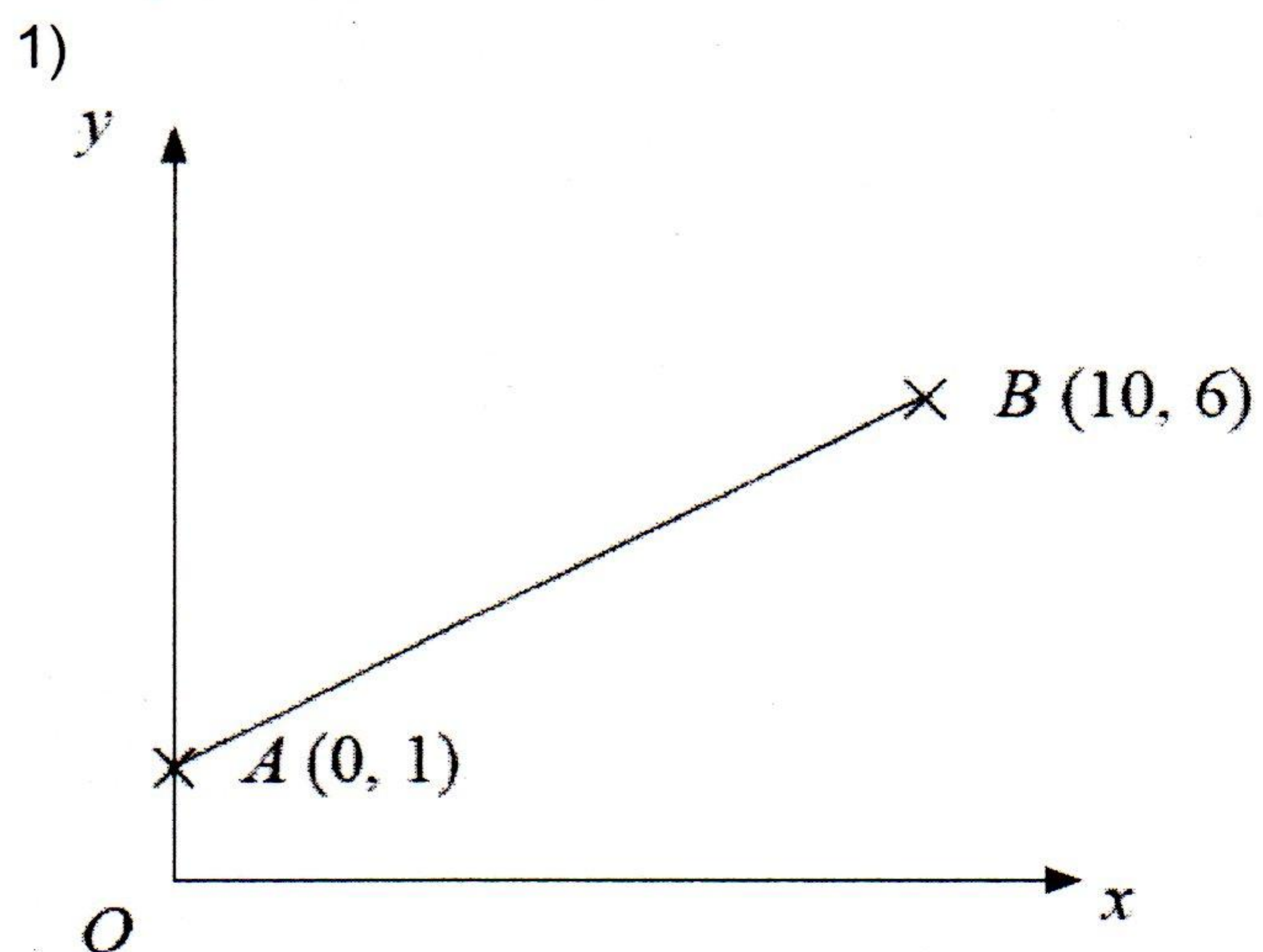
Perpendicular To line 'L'	Passes through 'B'	Equation of St. Line
$y = 2 - 5x$	(2,8)	
$3x - 5y = 12$	(2, -5)	
$2x - 3y = 7$	(-3,5)	
$5x = 2y - 7$	(-5,-7)	
$2x + 2y - 5 = 0$	(2, -7)	

Can you find the equation of straight line if two points are known?

Can you find the equation of straight line parallel to given line and also passes through the given point?

Can you find the equation of straight line perpendicular to given line and also passes through the given point?





A is the point (0, 1)

B is the point (10, 6)

(a) The equation of the straight line through A and B.

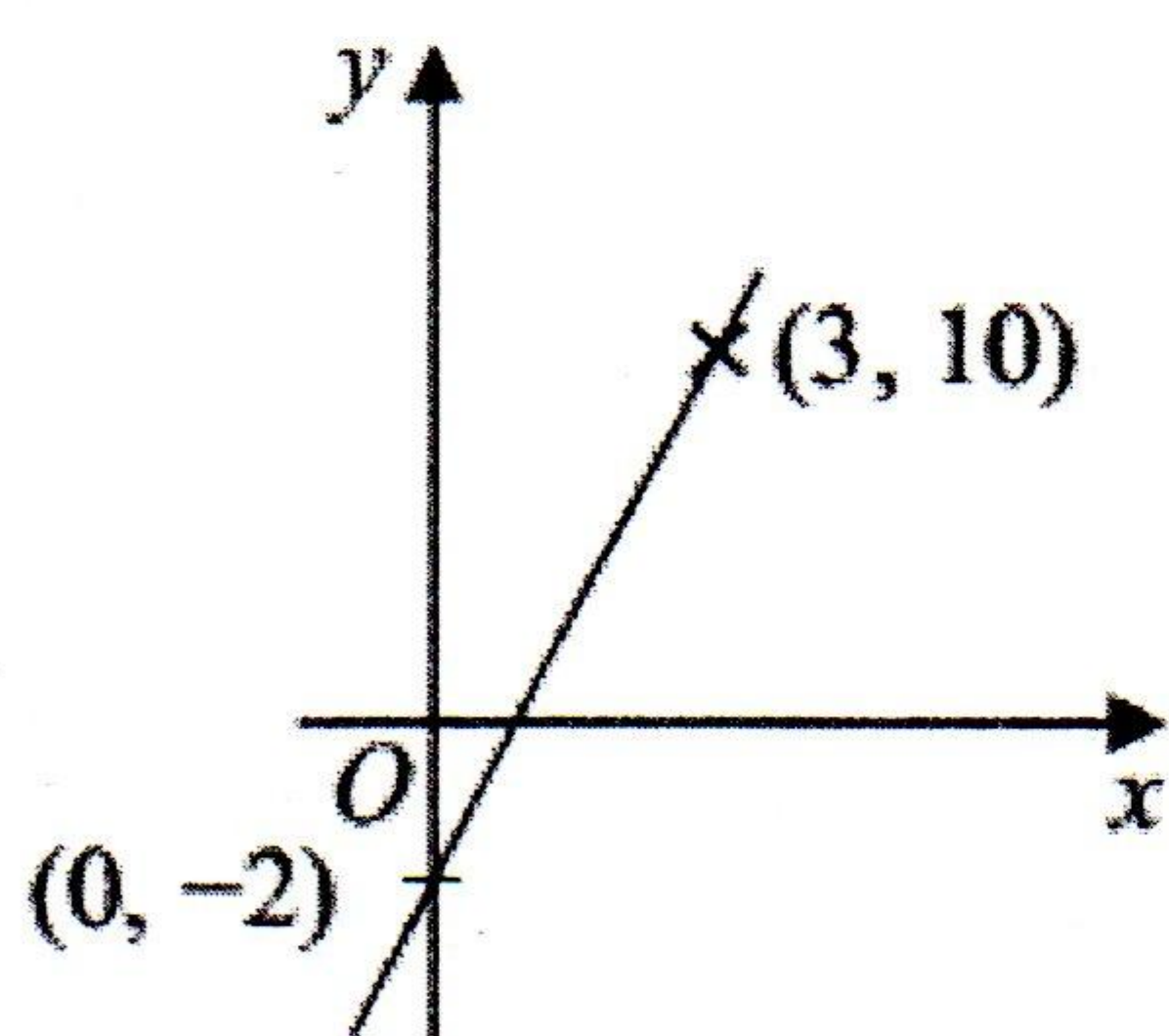
(b) Write down the equation of another straight line that is parallel to AB

(c) Write down the equation of another straight line that passes through the point (0, 1)

(d) Find the equation of the line perpendicular to AB passing through B.

2) A straight line passes through (0, -2) and (3, 10).

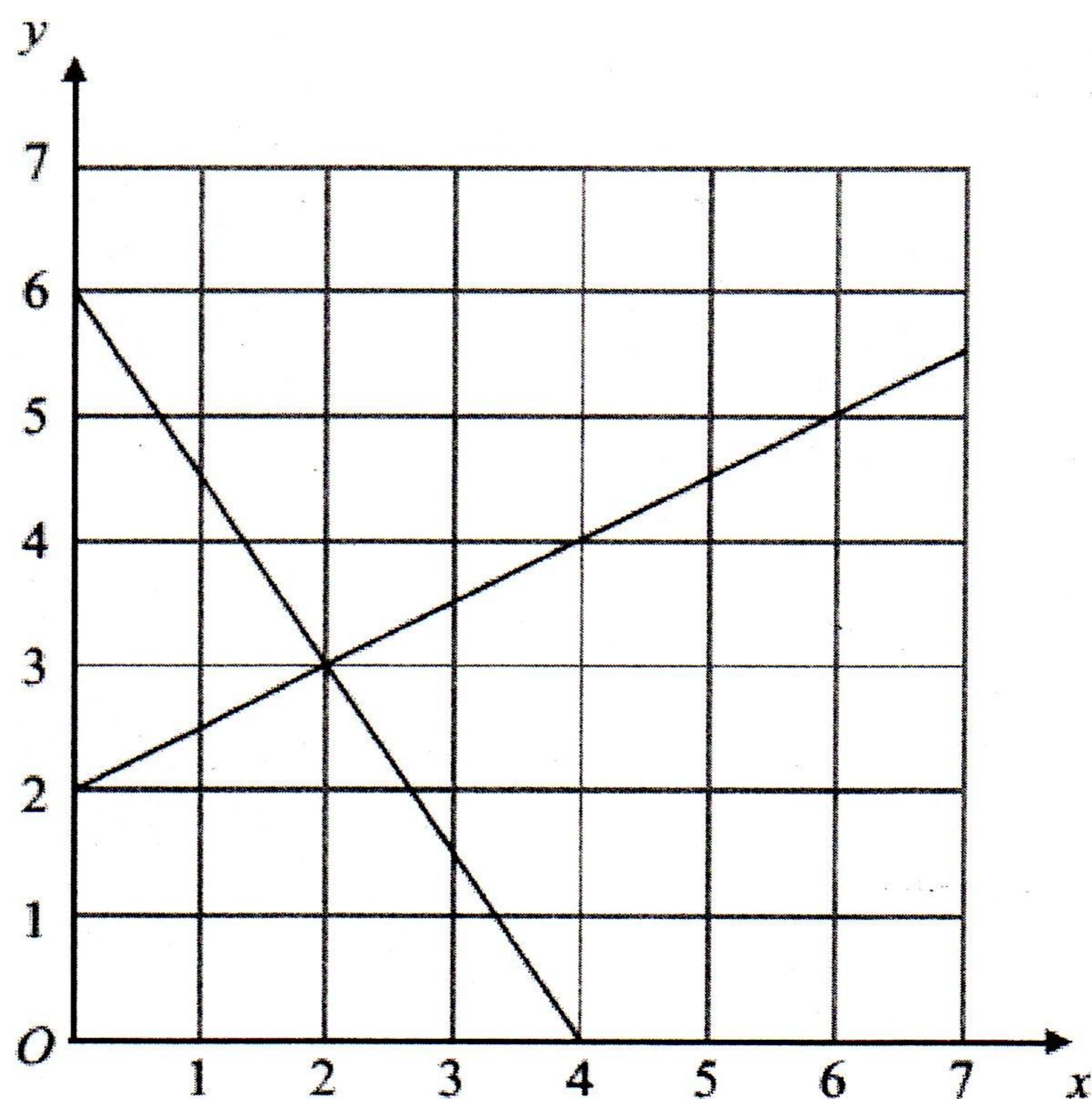
Find the equation of the straight line.



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3) The line  $y = 2x + 3$  meets the line  $y = 4x + 2$  at the point  $P$ .  
Find an equation of the line which is perpendicular to the line  $y = 2x + 3$  and which passes through the point  $P$ .



The diagram shows graphs of  $y = \frac{1}{2}x + 2$

and  $2y + 3x = 12$

(a) Use the diagram to solve the simultaneous equations

$$y = \frac{1}{2}x + 2$$

$$2y + 3x = 12$$

$x = \dots\dots\dots y = \dots\dots\dots$

(b) Find an equation of the straight line which is parallel to the line  $y = \frac{1}{2}x + 2$  and passes through the point  $(0, 4)$ .

$\dots\dots\dots$