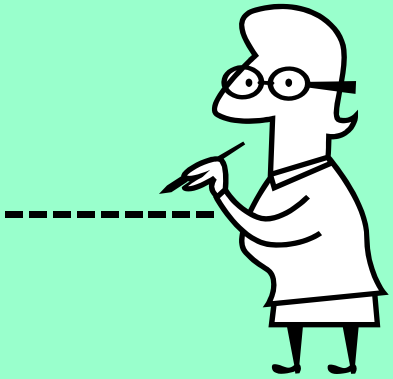
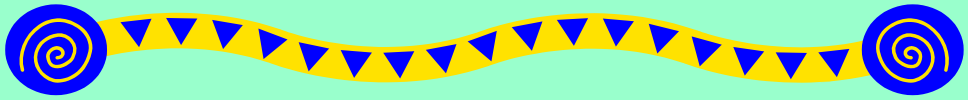
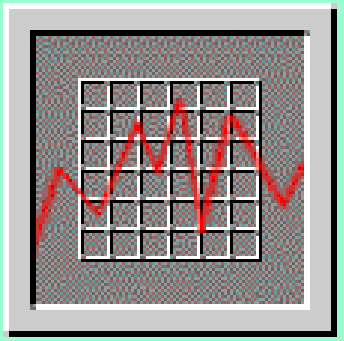






5.

Special Lines

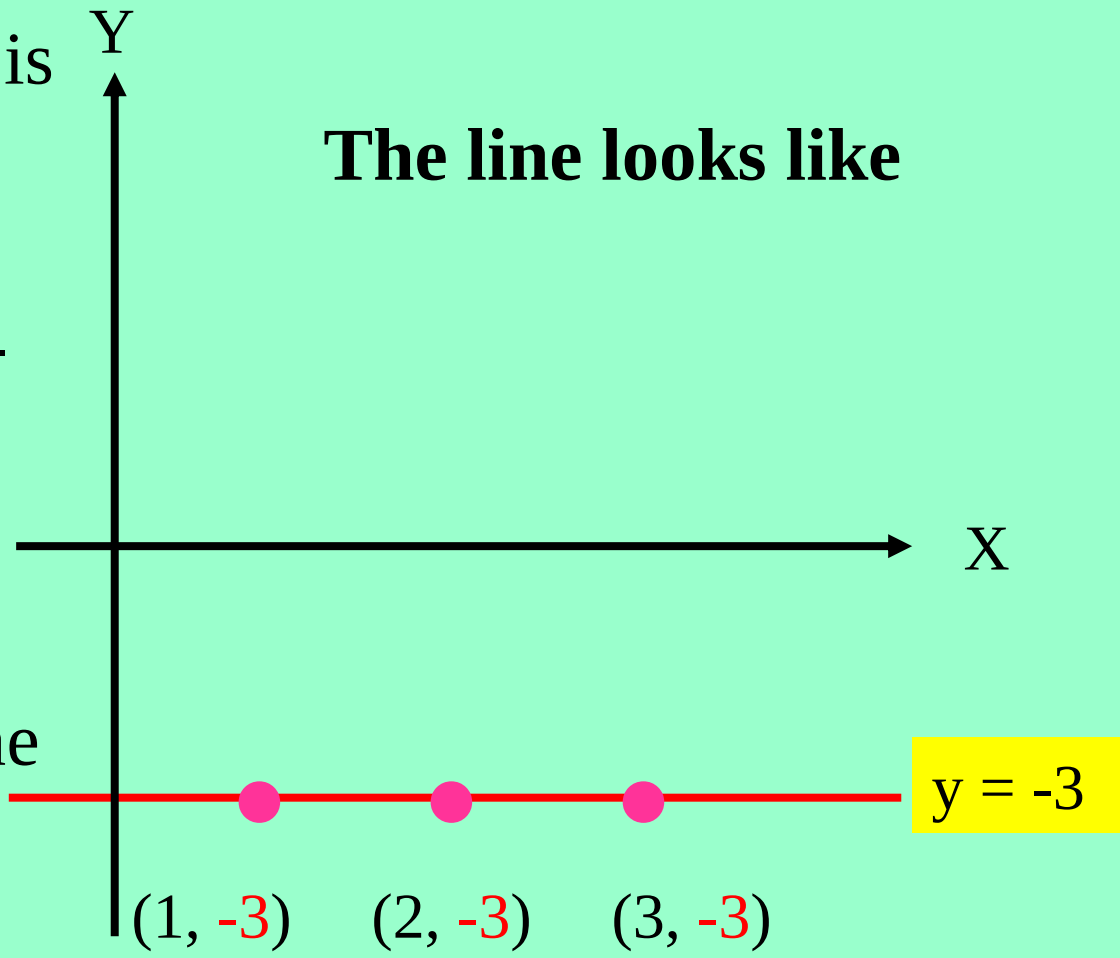
Horizontal Lines, Vertical Lines and Lines through the Origin

Equations of Lines

- Every line consists of a set of points which have some common property.
- This means that all the points on the line obey the same rule.
- This rule is called the equation of the line.
- The equation of a line is usually a formula connecting x and y.
- This tells us the connection between the x-coordinate & y-coordinate for each point on the line.

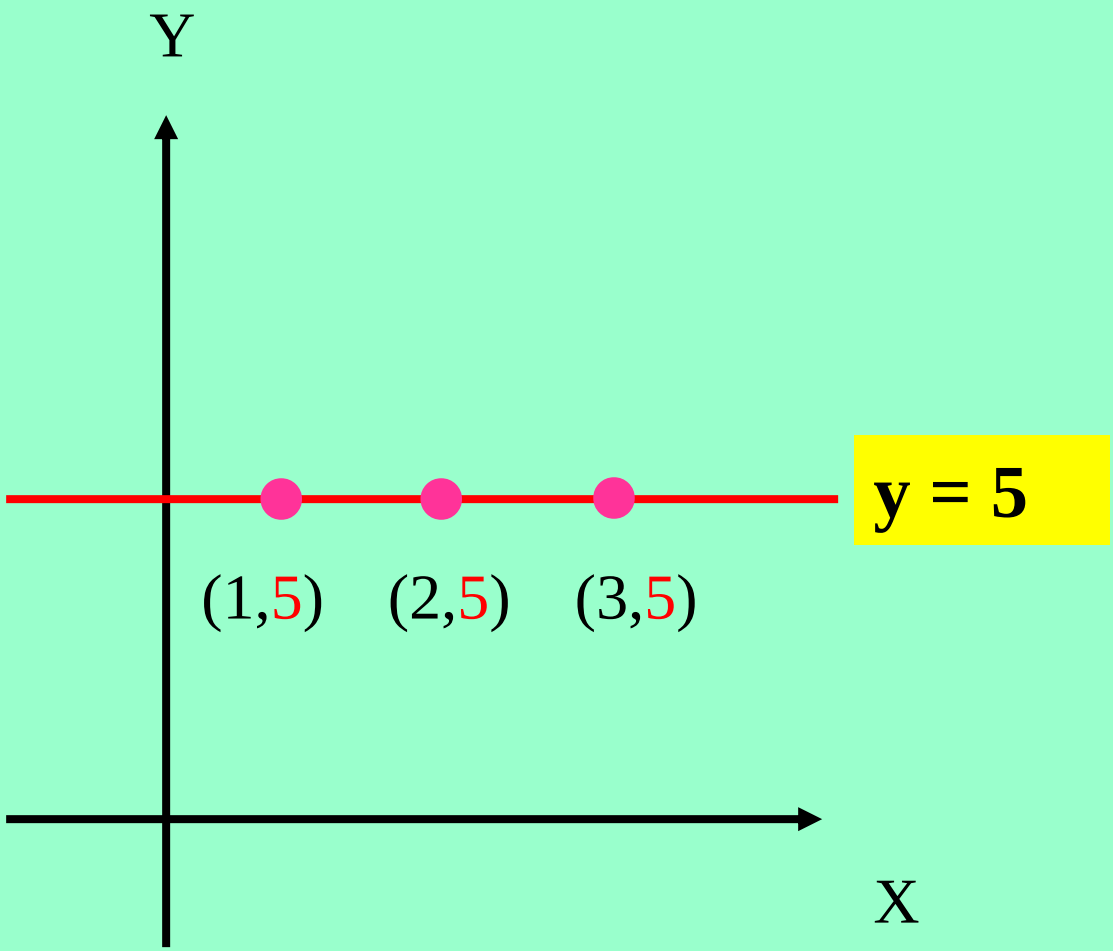
Horizontal Lines

- Every horizontal line is in the form y = k.
- This is because each point has the same y-coordinate.
- Consider the line
  y = -3
- Every point on the line has a y-coord of -3



Example

Sketch the graph of y = 5



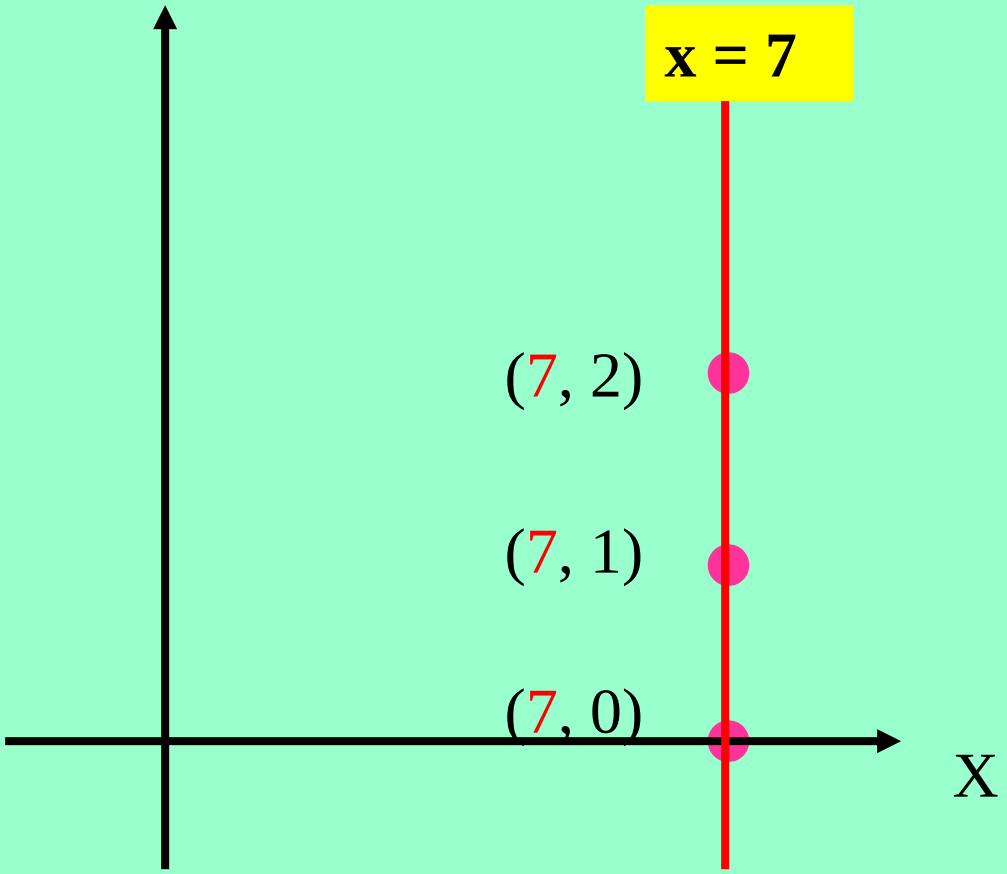
Every point on the line has a y-coordinate of 5 so the line is called

y = 5

Vertical Lines

- Every vertical line is in the form x = k.
- This is because each point has the same x-coordinate.
- Consider the line
  x = 7
- Every point on the line has an x-coord of 7

The line looks like

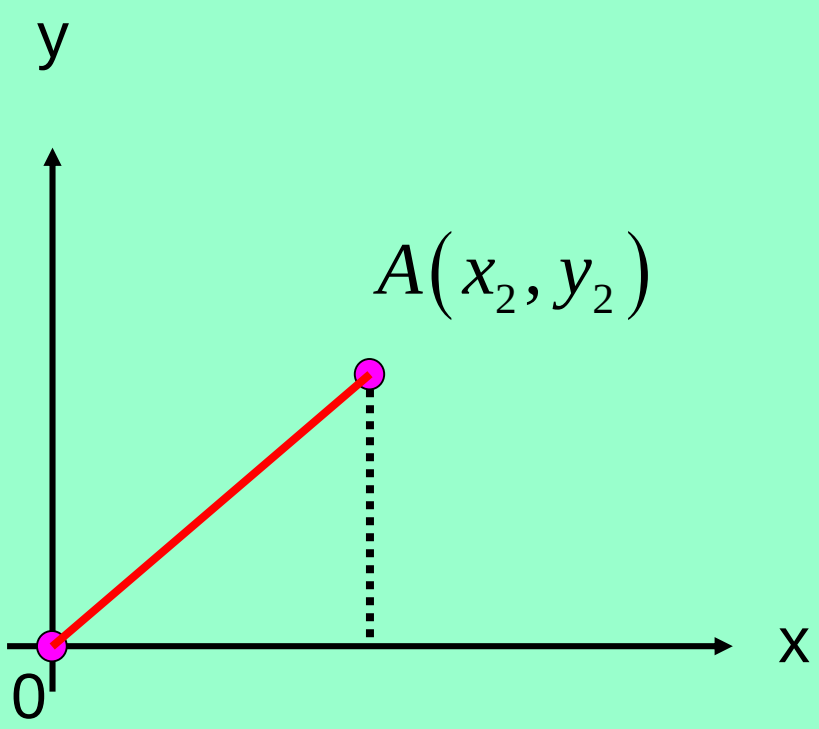


Lines through the Origin

To find the equation of a line through the origin:

Using our formula for gradients:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{y_2 - 0}{x_2 - 0} = \frac{y_2}{x_2}$$



As line goes through Origin, Intercept is 0.

So $$y = mx = \frac{y_2}{x_2} x$$

Example 1

Find the equation of OP, where O is the origin and P is the midpoint of Q (4, 6) and R (10, 10)

(x_1, y_1) (x_2, y_2)

Solution :

1. Find P, midpoint of QR:

$$P\left(\frac{10+4}{2}, \frac{10+6}{2}\right) \longrightarrow \text{P (7 , 8)}$$

2. Point through O so use y = mx

$$y = \frac{y_2}{x_2}x \quad = \frac{8}{7}x$$

$$y = \frac{8}{7}x$$

Homework Booklet, EX 5 (ALL)