

# Coordinate Geometry

- Gradient of a Segment or Line, given to points
- Coordinates of the Midpoint of a Segment
- Distance between two points, which is the same as the length of a Segment

## Gradient of a Segment or Line.

there are 3 ways of getting this info

1. Given 2 points. Point 1  $(x_1, y_1)$  & Point 2  $(x_2, y_2)$

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

Note:  $y_2 - y_1$  is called the RISE and  $x_2 - x_1$  is called the RUN

2. Given a graph:

- Find two clear points on the graph and use the formula from part 1.
- Find two clear points and draw a slope-triangle. Be careful with the signs of the rise and run.

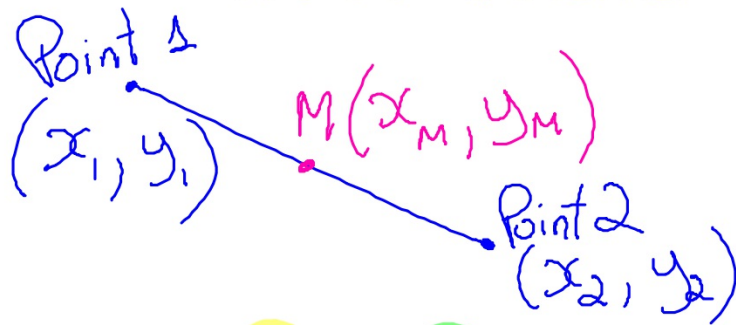
3. Given the gradient of another line that is Parallel or Perpendicular to it.

4. Given the equation of the line.

- In the form of  $y=mx+b$ , then slope =  $m$  (which is the coefficient of the  $x$ -term)
- In the form of  $Ax + By + C = 0$  (standard form), then you must change the form to  $y=mx+b$

We will work on these next class!

## MIDPOINT of a SEGMENT



$$M(x_m, y_m)$$

$$M\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$$

which means that

$$x_m = \frac{x_2 + x_1}{2}$$

and

$$y_m = \frac{y_2 + y_1}{2}$$

Typical examples:

1. Given the coordinates of the endpoints of the segment

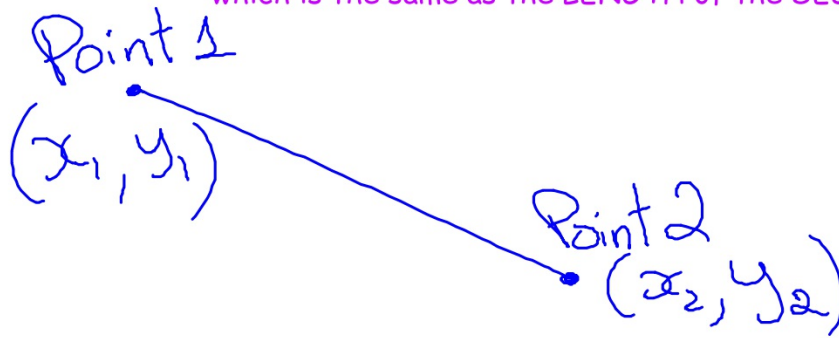
*easy!!!  
😊 just plug in!*

2. Given the coordinates of 1 endpoint and the coordinates of midpoint, find the coordinates of the 2nd endpoint.

*a little trickier!!*

## DISTANCE BETWEEN TWO POINTS

which is the same as the LENGTH of the SEGMENT



$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

### Homework:

1. Gradients: page 90-3A: 2c,d,e,f  
Page 91-3B: 1b + 2c,d,e + 3 + 4
2. Midpoints: page 540-3G: all
3. Length of segment: page 541-3H:  
all