

# GRADIENT AND INTERCEPT REFERENCE MAT

## 1. THE LINEAR EQUATION

$$y = mx + c$$

$m$  = gradient (slope)

$c$  = y-intercept

**Meaning:**

The line crosses the y-axis at  $c$  and has gradient  $m$ .

## 2. WHAT DO $m$ AND $c$ MEAN?

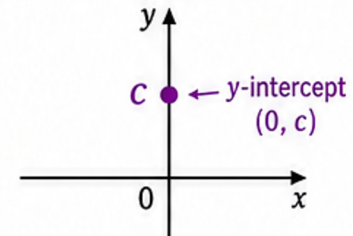
### GRADIENT $m$ (SLOPE)

The steepness and direction of the line.

- $m > 0$  Line rises
- $m < 0$  Line falls
- $m = 0$  Horizontal line

### Y-INTERCEPT $c$

The point where the line crosses the y-axis.



## 3. GRADIENT FROM TWO POINTS

For two points  $(x_1, y_1)$  and  $(x_2, y_2)$  on a line:

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

Up  $\rightarrow \uparrow$  positive  
Down  $\rightarrow \downarrow$  negative

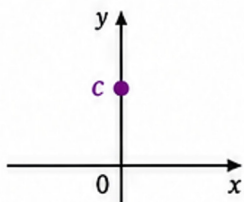
## YOUR NOTES / EXAMPLES

## 4. INTERCEPTS

### Y-INTERCEPT

Set  $x = 0$  in  $y = mx + c$ .

Point:  $(0, c)$



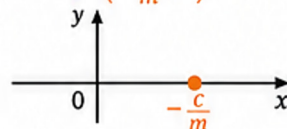
### X-INTERCEPT

Set  $y = 0$  in  $y = mx + c$ .

$$0 = mx + c$$

$$x = -\frac{c}{m} \quad (\text{if } m \neq 0)$$

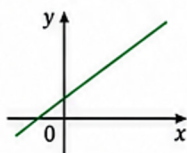
Point:  $(-\frac{c}{m}, 0)$



## 5. TYPES OF LINES

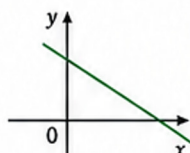
### POSITIVE GRADIENT

$$m > 0$$



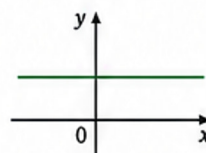
### NEGATIVE GRADIENT

$$m < 0$$



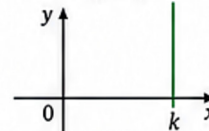
### ZERO GRADIENT (HORIZONTAL)

$$m = 0$$



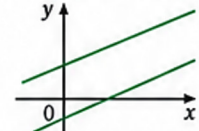
### UNDEFINED GRADIENT (VERTICAL)

$$x = k$$



### PARALLEL LINES

Same gradient, different intercepts



## 6. QUICK REFERENCE

Equation of a line

$$y = mx + c$$

Gradient from two points

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

Y-intercept

$$(0, c)$$

X-intercept

$$(-\frac{c}{m}, 0) \quad (\text{if } m \neq 0)$$

## 7. PRACTICE / WORKING SPACE