3.2) Quadratic Graph

Graphs:Quadratic Graphs.

Quadratic function → $f(x) = ax^2 + bx + c$

$y = ax^2 + bx + c$

Quadratic graphs

- Completing the square
- Factorise (x - intercept)

Quadratic Graphs by Completing the Square

$$y = ax^2 + bx + c \longrightarrow y = a(x-h)^2 + k$$

Graphs:Quadratic Graphs.

$$y = a(x-h)^2 + k$$

Example:

1) $y = 2(x-5)^2 + 3$

2) $y = -(x+4)^2 - \frac{15}{2}$

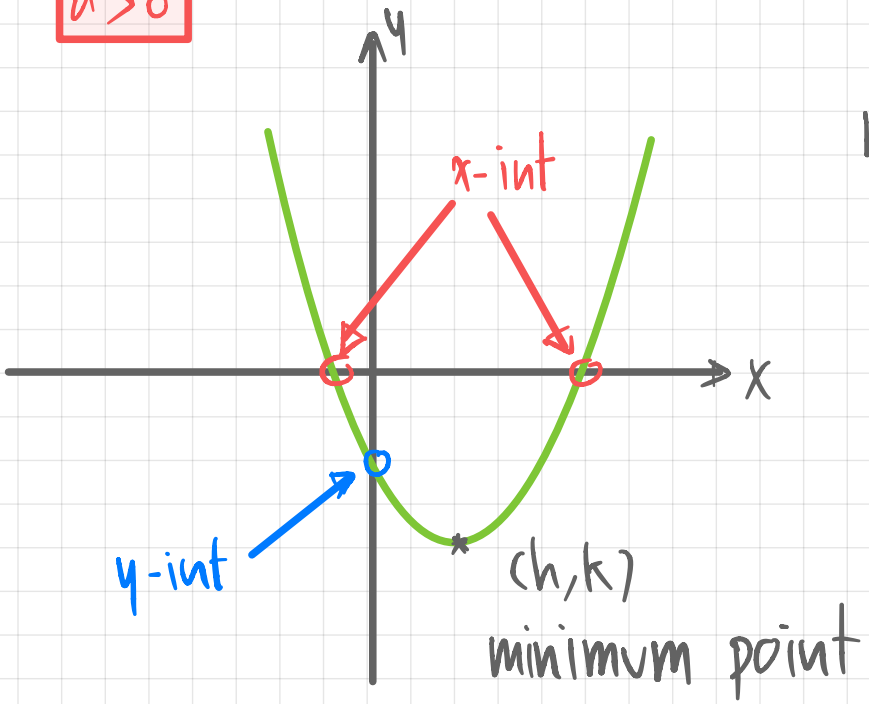
3) $y = (x-\frac{1}{2})^2 + \frac{7}{2}$

4) $y = -\frac{1}{2}(x+1)^2 + 3$

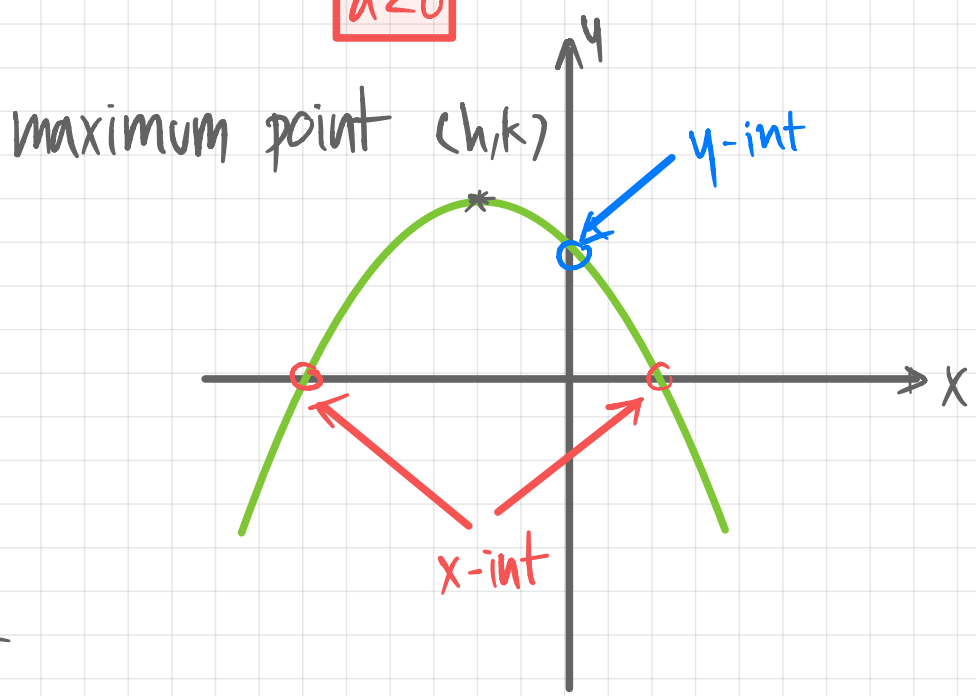
Graphs:Quadratic Graphs.

$$y = a(x-h)^2 + k$$

$a>0$



$a<0$



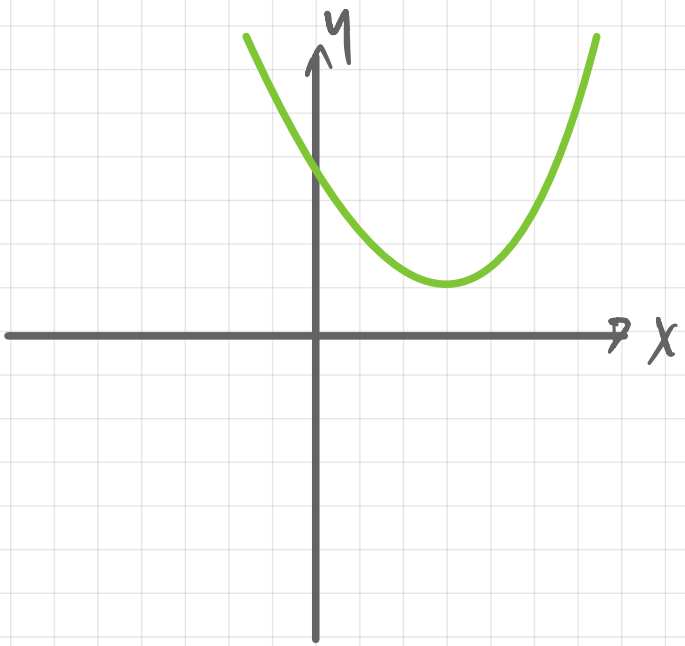
Symmetry line $x = h$

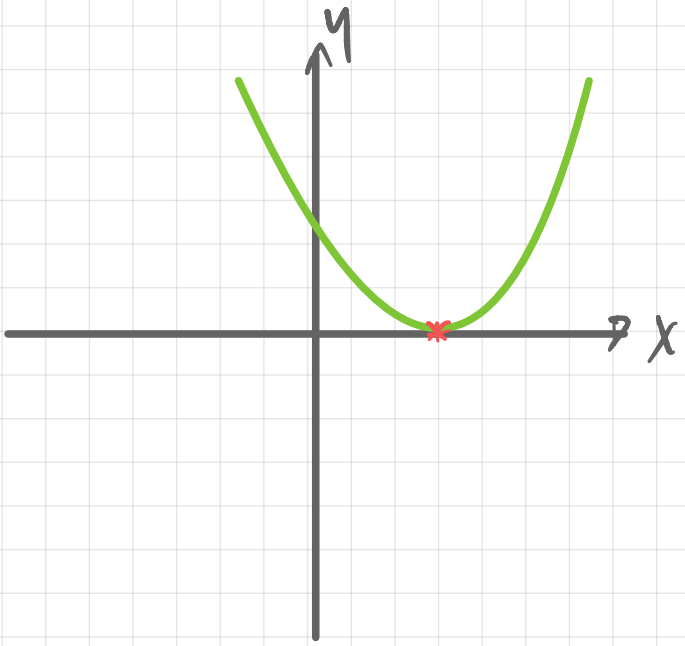
Minimum value $y = k$ or Maximum value $y = k$

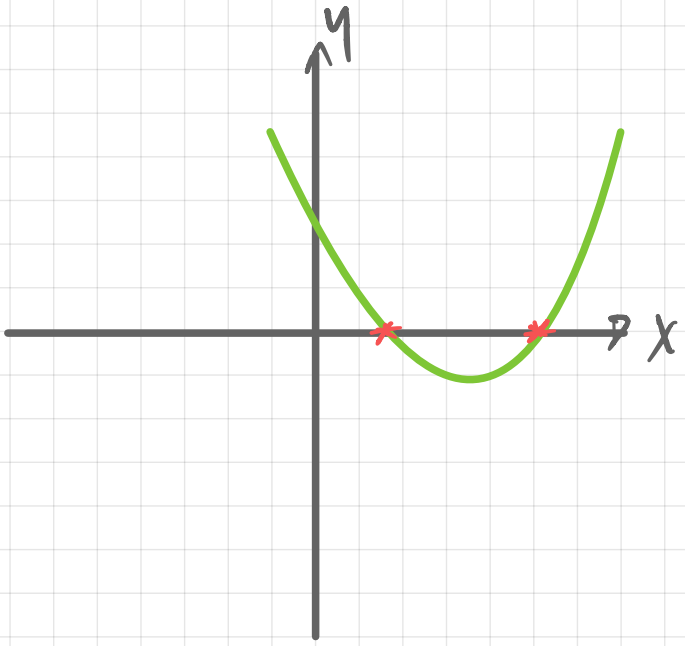
Graphs:Quadratic Graphs.

Intercept

- y-int → sub $x = 0$ (1 point)
- x-int → sub $y = 0$ (0 or 1 or 2 points)





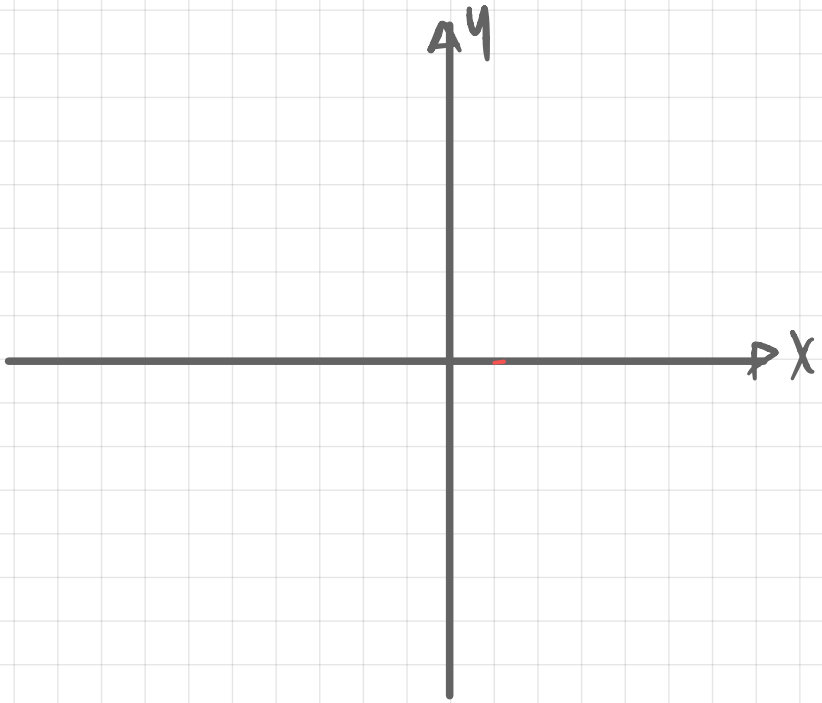


Graphs:Quadratic Graphs.

Example: $f(x) = x^2 + 2x - 3$

(i) Show that $f(x) = A(x+B)^2 + C$

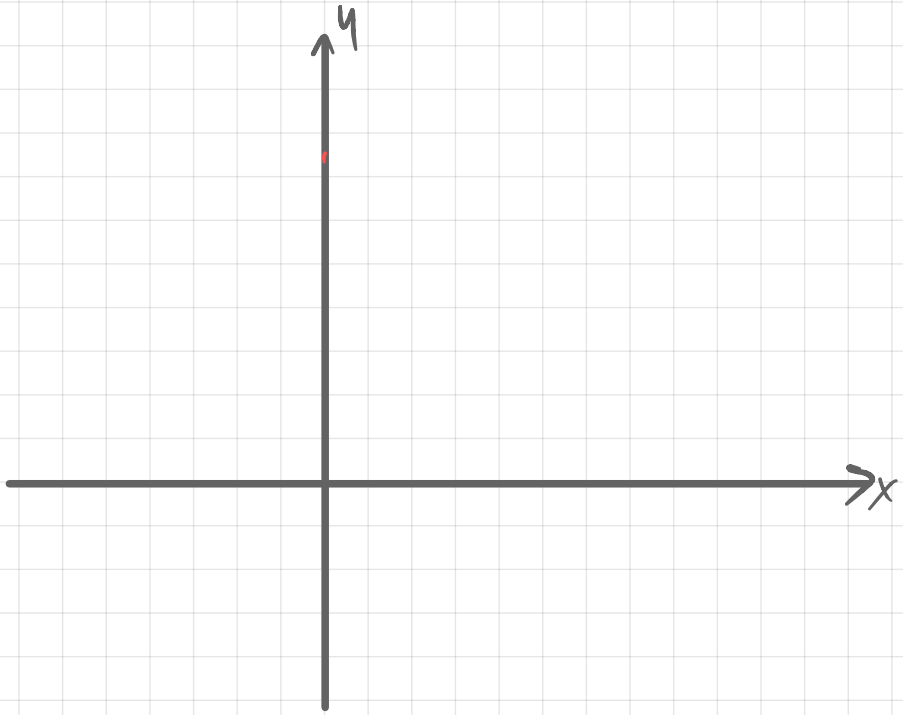
(ii) Sketch $y = f(x)$ and show intercept axis, and turning point.



Graphs:Quadratic Graphs.

Example: $f(x) = (x-3)^2 + 1$

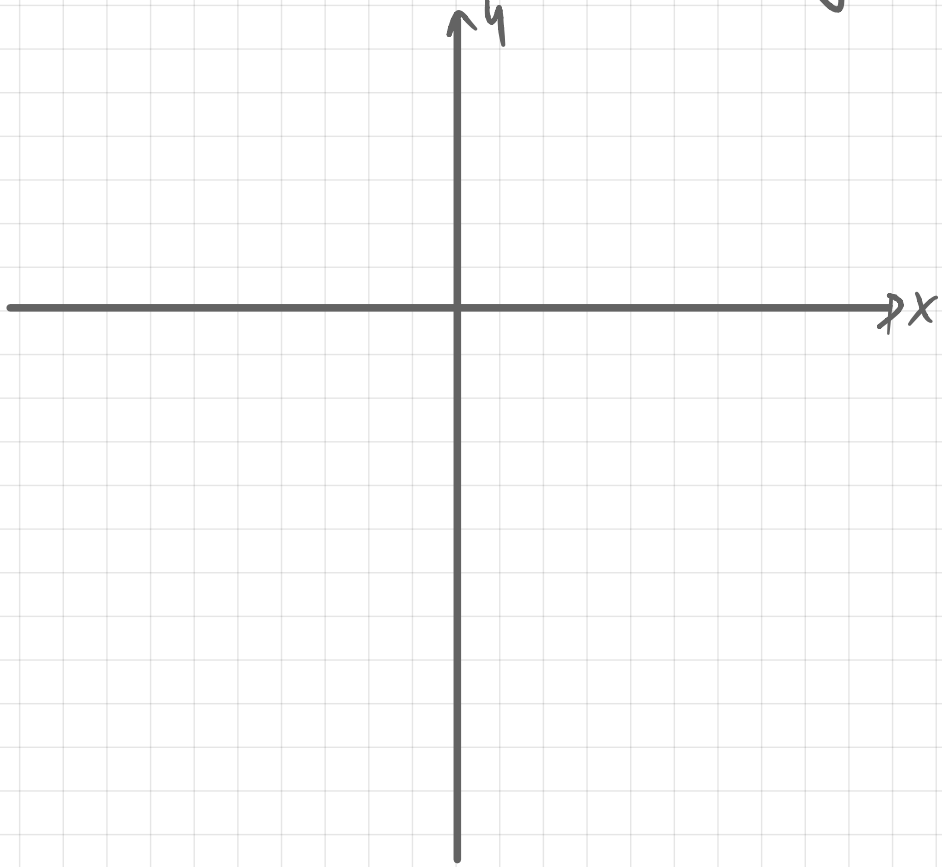
Sketch $y = f(x)$ and show intercept axis, and turning point.



Graphs:Quadratic Graphs.

Example: $f(x) = -\frac{1}{2}(x+2)^2 - 3$

Sketch $y = f(x)$ and show intercept axis, and turning point.



Graphs:Quadratic Graphs.

Quadratic Graphs by Factorise

$y = ax^2 + bx + c \longrightarrow y = (\ldots)(\ldots)$

Graphs:Quadratic Graphs.

Example:

1) $y = (2x+1)(x-7)$

2) $y = x(x+5)$

3) $y = (x-1)(2-3x)$

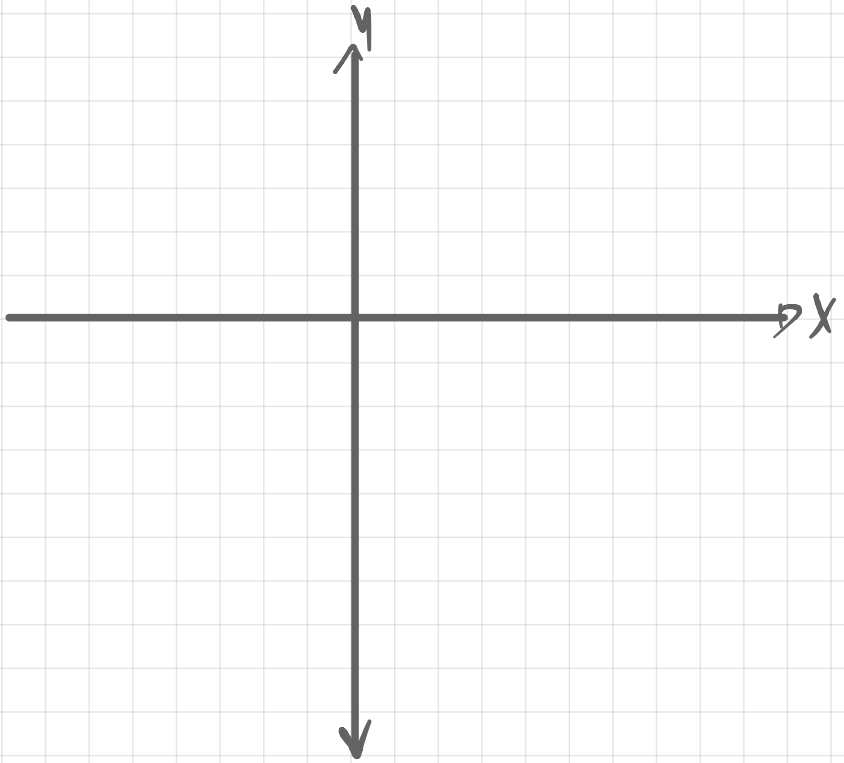
4) $y = (3-2x)(4-x)$

5) $y = -2x(3+x)$

Graphs:Quadratic Graphs.

Example: $f(x) = (x+1)(x-3)$

Sketch $y = f(x)$ and show intercept axis, and turning point.



Graphs:Quadratic Graphs.

Example: $f(x) = x(4-x)$

Sketch $y = f(x)$ and show intercept axis, and turning point.