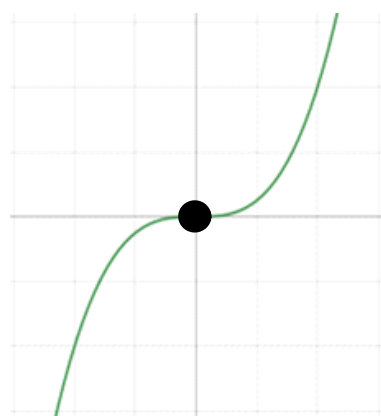
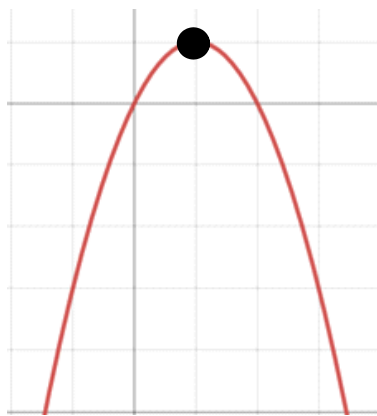
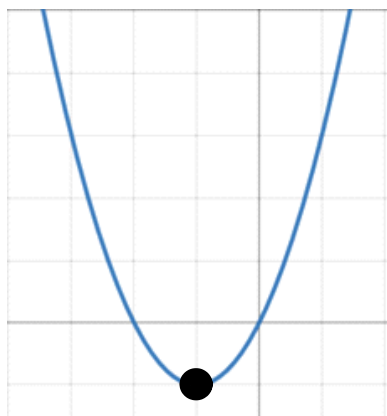


CRITICAL / STATIONARY POINTS

$$f'(x) = 0$$



The Sign Test



Minimum (MIN)

- ❖ The gradient to the left of the critical point is negative ; $f'(x) < 0$
- ❖ The gradient at the critical point is 0 ; $f'(x) = 0$
- ❖ The gradient to the right of the critical point is positive ; $f'(x) > 0$

Maximum (MAX)

- ❖ The gradient to the left of the critical point is positive ; $f'(x) > 0$
- ❖ The gradient at the critical point is 0 ; $f'(x) = 0$
- ❖ The gradient to the right of the critical point is negative ; $f'(x) < 0$

Horizontal Point of Inflection (HPOI)

- ❖ The gradient to the left of the critical point is negative/positive
- ❖ The gradient at the critical point is 0
- ❖ The gradient to the right of the critical point is negative/positive

Example Find the coordinates and nature of the critical point(s) of the function $f(x) = x^3 + 3$

Critical points are when $f'(x) = 0 \rightarrow 3x^2 = 0 \rightarrow x^2 = 0 \rightarrow x = 0$

✧ Now find the gradient either side of 0

x	-0.1	0	+0.1
$f'(x)$	+ve	0	+ve



\therefore A horizontal point of inflection at the point $(0, f(0)) = (0, (0)^3 + 3) = (0, 3)$

