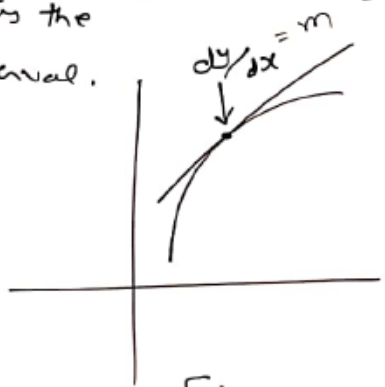
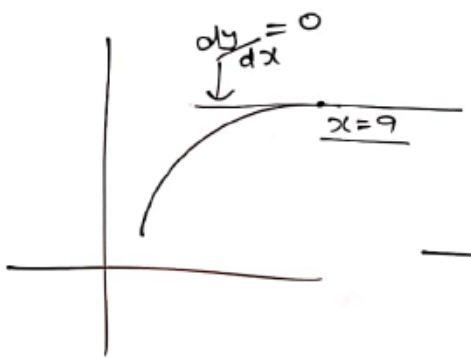
AOD

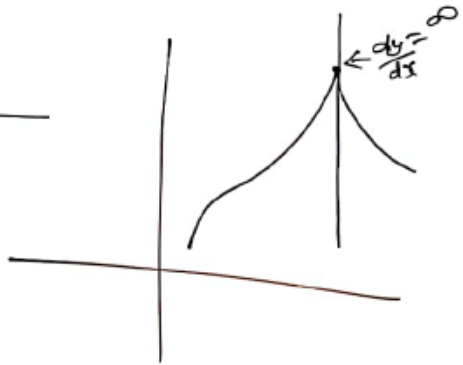
 # Critical points:- it is a collection of points at which $f'(x)$ is zero or $f'(x)$ undefined.

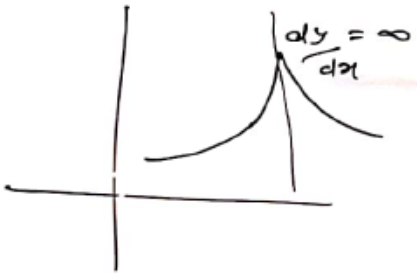
*** Note:-** Critical point is the interior point of an interval.

$x \in [a, b]$









$\left[\frac{dy}{dx} = \text{slope of Tangent} = \tan\theta\right] = m$

0°

90°

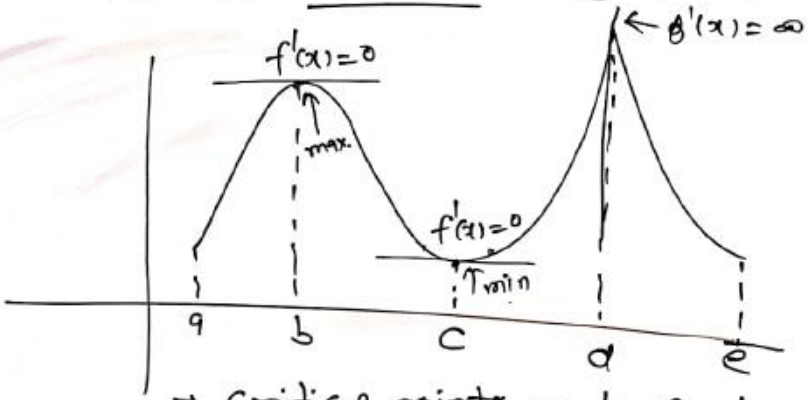
$f(x) = x^2 + a, \quad x \in (-1, 2)$

$f'(x) = 2x = 0 \quad x \in [0, 2]$

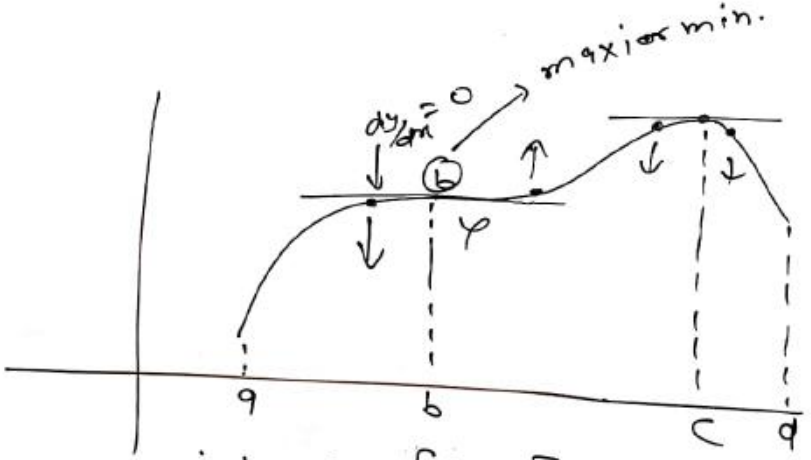
$x = 0$

AOD

Critical points :- [b, e]



→ Critical points → b, c, d



interval → [a, d]

Ex:- Find critical points of $\left[y = \frac{x^3}{3} - \frac{5x^2}{2} + 6x + 1\right]$ for $x \in [2, 4]$

Soln:- diff → $y' = \frac{3x^2}{3} - \frac{10x}{2} + 6$

$y' = x^2 - 5x + 6$

$y' = x^2 - 3x - 2x + 6$

$y' = x(x-3) - 2(x-3) = 0 \Rightarrow x = 3, 2$

So critical point = 3 Ans

AOD

Critical points :-

Q. Find critical points for $y = (x-2)^{2/3}(2x+1)$ $\left[(-\infty, \infty)\right]$

Sol^n :- diff → $y' = (x-2)^{2/3}(2) + (2x+1)\cdot\frac{2}{3}(x-2)^{2/3-1}$

① → $y' = (x-2)^{2/3}\cdot 2 + \frac{2}{3}(2x+1)\cdot(x-2)^{-1/3}$

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

③ $y' = \frac{6(x-2)+2(2x+1)}{3\cdot(x-2)^{1/3}} \overset{④}{=} \frac{6x-12+4x+2}{3(x-2)^{1/3}} \overset{⑤}{=} \frac{10x-10}{3(x-2)^{1/3}} \overset{⑥}{=} \boxed{\frac{10(x-1)}{3(x-2)^{1/3}} = y'}$

H.W. ⑦ Sol^n critical points are :- $\boxed{1, 2}$ ∧

Ex :- If slope of tangent on curve $xy + ax + by = 0$ at the point $(1,1)$ is 2, then find a & b.

$aa = \cos x$ → is the value of $\boxed{a = 4}$

$-1 \le aa \le 1$

$\boxed{-\frac{1}{a} \le a \le \frac{1}{a}}$ ∧