Hyochan Cho


Volume $= x \times (20-2x) \times (20-2x)$

volume of the box $= x(20-2x)^2$

$= 4x(x-10)^2$ $\quad (0 < x < 10)$

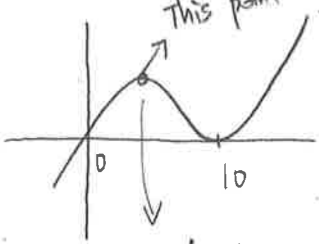
↳ if $x$ is bigger than 10 not possible to cut the edges.

$f(x) = x(x-10)^2 = x^3 - 20x^2 + 100x$

$f(x)' = 3x^2 - 40x + 100$

$f(x)' = 0$ to be the maximum.

This point will be the maximum.




gradient of this point is 0.

$3x^2 - 40x + 100 = (3x-10)(x-10)$

$x = \frac{10}{3}$ or $\cancel{10}$

↳ this is the point where the graph meets the $x$ axis.

$\therefore$ Max Volume $= \frac{10}{3} \times \frac{40}{3} \times \frac{40}{3}$

$= \frac{16000}{27}$ $(cm^3)$