

Problem 1. *State and draw the following theorems:*

(a) *Extreme Value Theorem*

(b) *Fermat's Theorem*

(c) *Rolle's Theorem*

(d) *Mean Value Theorem*

Problem 2. *Draw a function that has the following properties:*

(a) *Absolute maximum at $x = 3$, absolute minimum at $x = 0$, no local minima.*

(b) *Absolute minimum at $x = 0$, not differentiable at $x = 0$, no maximum.*

Problem 3. *Suppose $f'(x) = g'(x)$ on an interval (a, b) . What can you conclude about f and g ? Prove you're right.*

Problem 4. *Find the absolute minimum and maximum values of $f(t) = t + \cot(t/2)$ on the interval $[\pi/4, 7\pi/4]$.*