DATE:_____

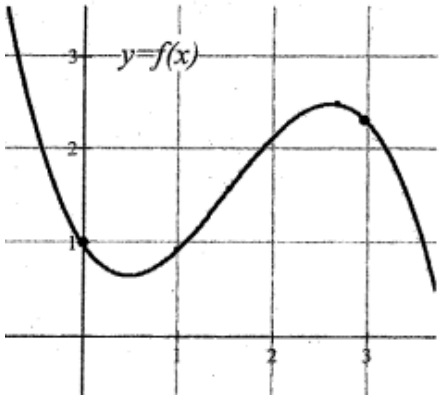
Mean Value Theorem

Secant Lines and Tangent Lines

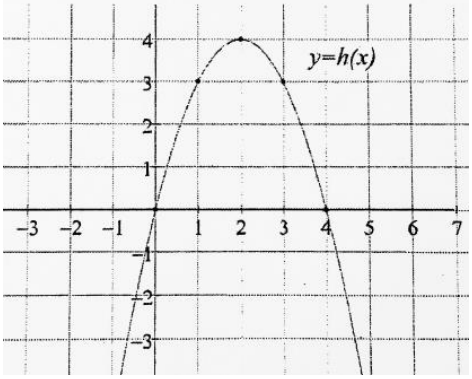
a) For each graph, draw the secant line through the two points on the graph corresponding to the endpoints on the indicated interval.

b) In the indicated interval, draw any tangent line(s) that are parallel to the secant line. Estimate the *x*-value of the point of tangency.

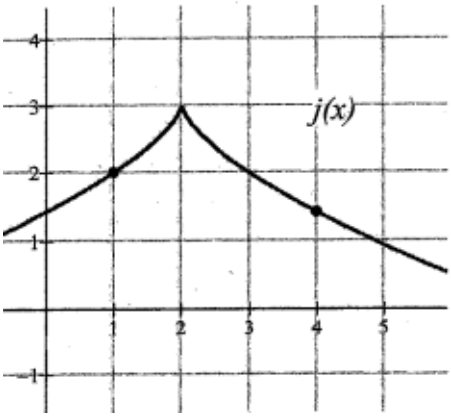
$f(x)$ on the interval $[0, 3]$



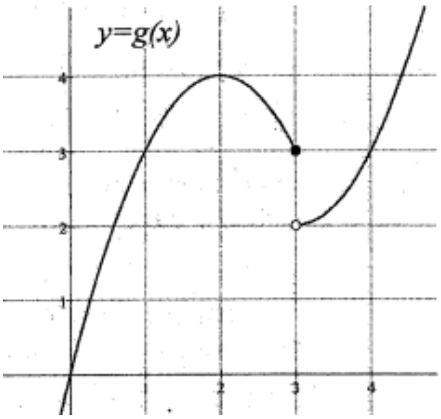
$h(x)$ on the interval $[0, 4]$



$j(x)$ on the interval $[1, 4]$



$g(x)$ on the interval $[2, 4]$



c) Which graphs are continuous on $[a, b]$? _____

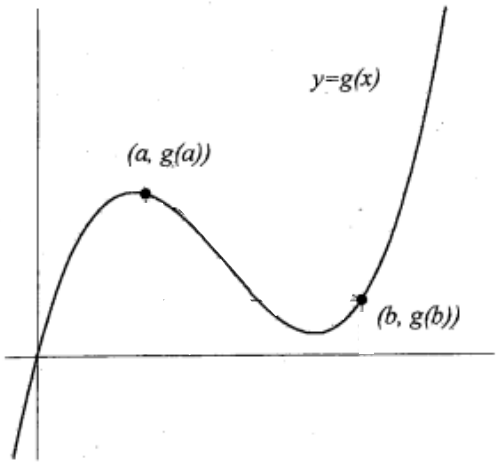
If the function is continuous on $[a, b]$, is there a tangent line parallel to the secant line?_____

d) Which graphs are differentiable on (a, b)? _____

If the function is differentiable on (a, b), is there a tangent line parallel to the secant line?___

e) What can you conclude must be true about a function in order to draw a tangent line parallel to the secant line?

MEAN VALUE THEOREM



Examples:

Determine if the Mean Value Theorem applies. If MVT does apply, explain what conclusions you can draw from it; if MVT does not apply, state why not.

1. $f(x) = x^3 - x^2 - 2x$ on $[-1,1]$

2. $g(x) = x - \sin x$ on $[-\pi, \pi]$

3. $h(x) = \frac{x^2}{x^2-1}$ on $[-1,1]$.