

### 3.4 Concavity and the Second Derivative Test

#### Definition of Concavity

Let  $f$  be differentiable on an open interval  $I$ . The graph of  $f$  is **concave upward** on  $I$  if  $f'$  is increasing on the interval and **concave downward** on  $I$  if  $f'$  is decreasing on the interval.



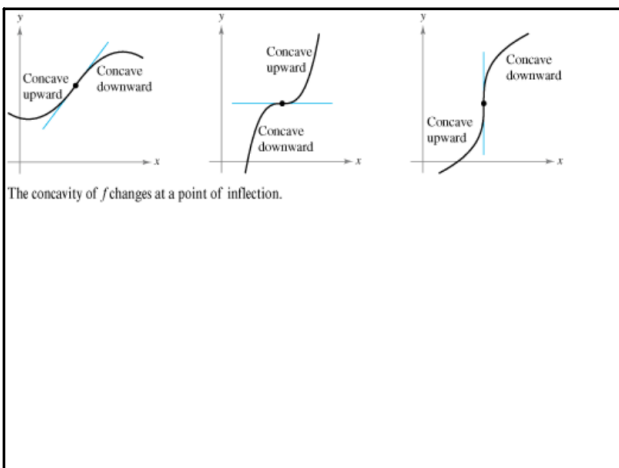
Corn

#### THEOREM 3.7 Test for Concavity

Let  $f$  be a function whose second derivative exists on an open interval  $I$ .

1. If  $f''(x) > 0$  for all  $x$  in  $I$ , then the graph of  $f$  is concave upward in  $I$ .
2. If  $f''(x) < 0$  for all  $x$  in  $I$ , then the graph of  $f$  is concave downward in  $I$ .

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