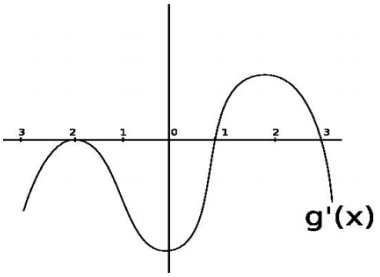
1.(6 points) The figure shows the graph of the derivative g' of some function g. Find the intervals on which the original function g is increasing and decreasing, and classify all local extrema of g.



2. (10 points) A cylinder's height is increasing at the rate of 1 inch per minute while its radius is decreasing at the rate of 1 inch per minute. Find the rate of change in the volume of this cylinder at the instant when its radius is 10 inches and its height is 8 inches. Is the volume increasing or decreasing? (Your diagram should clearly indicate the variables you are choosing)

3.(4 points) Prove or disprove:

Assume that derivatives of all orders for both f and g exist. Suppose $f(x)$ is increasing and concave up and $g(x)$ is concave up. Then $(f \circ g)(x)$ is concave up.