3. [15 points] Answer "True" or "False" for each of the following, and **include a brief explanation of your answer.** A picture may be sufficient for an explanation, if appropriate. The functions h, h', m and m' referred to in the problem are all differentiable on their domain. The letters a and b represent constants. (Note: Answer "True" only if the statement is *always* true.)

i) If $y = h'(x)m(x) - h(x)m'(x)$, then $\dfrac{dy}{dx} = h''(x)m(x) - h(x)m''(x)$.

                                                                                 True   False

ii) If $m''(a) = 0$, then $m(x)$ has an inflection point at $x = a$.

                                                                                 True   False

iii) If $h''(x) > 0$ on the interval $[a, b]$ and $h(a) > h(b)$, then $h(a)$ is the absolute maximum value of $h(x)$ on $[a, b]$.

                                                                               True   False

iv) There exists a continuous function $f(x)$ which is not differentiable at $x = 0$ with a local maximum at $(0, 5)$.

                                                                                 True   False

v) The function $g(x) = e^{-(x-a)^2/b}$ has a local maximum at $x = b$.

                                                                                 True   False