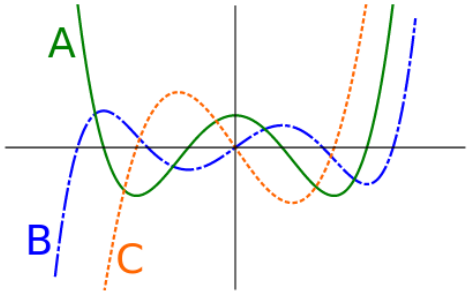
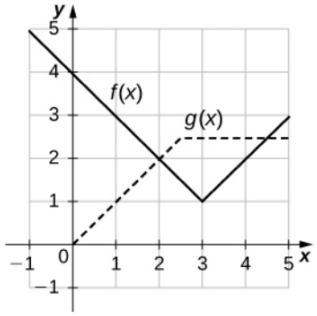
For questions: at52@rice.edu February 5

IN-CLASS ACTIVITY : DERIVATIVES IV

1. Drawn here is the graph of a function f along with the graphs of its first derivative f' and second derivative f''. Which graph is which ?



2. Below are the graphs of the functions $f(x)$ and $g(x)$.



Let $h(x) = f(x) + g(x)$. Find $h'(1)$, $h'(3)$ and $h'(4)$, if they exist. Write then an explicit formula for $f(x)$, $g(x)$ and their derivatives.

3. Find the equation of the tangent line to the graph of $f(x) = x^2 + \frac{4}{x} - 10$ at $x = 8$.

4. A potato is launched vertically upward with an initial velocity of 100ft/s from a potato gun at the top of a 85-foot-tall building. The distance in feet that the potato travels from the ground after t seconds is given by $s(t) = -16t^2 + 100t + 85$.

i) Find the velocity of the potato after 0.5s.

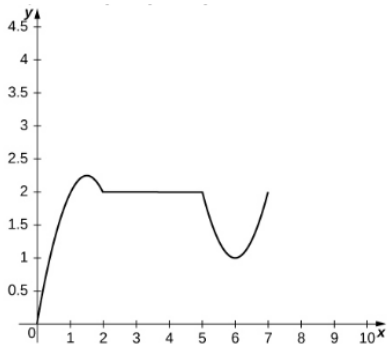
ii) Determine when the potato reaches its maximum height.

iii) Find the acceleration of the potato at 1.5s.

iv) Determine how long the potato is in the air.

v) Determine the velocity of the potato when it hits the ground.

5. The following graph shows the position $s(t)$ of an object moving along a straight line.



i) Determine the time intervals when the velocity is positive, negative, or zero.

ii) Sketch the graph of the velocity function.