For questions: at52@rice.edu February 12

IN-CLASS ACTIVITY : DERIVATIVES VI

1. For the following functions determine the intervals where they are increasing or decreasing and the intervals where they are concave up or concave down.

i) $f(x) = \sin(x) + \cos(x) \quad x \in [0, 2\pi]$ ii) $f(x) = x + \sin(x)$

2. Compute the derivative of the following functions :

(a) $f(x) = 3x^4 - 2x^2 + e$
(b) $f(x) = \sqrt{2}x^3 - \sin(1.5)x$
(c) $f(x) = \sqrt{x} + \sqrt[3]{x}$
(d) $f(x) = 3e^x + \cos(x)$
(e) $f(x) = x^2 + 2e^x$
(f) $f(x) = \sin(x) + e^2 - \sqrt{x}$
(g) $f(x) = \frac{1}{x} + e^x$
(h) $f(x) = -\frac{3}{x} - \cos(x)$

3. Compute the first, second, third and fourth derivatives of the functions $\sin(x)$, $\cos(x)$ and e^x.

4. Below the graph of a function $f(x)$ is given. Sketch the graph of $f'(x)$ and $f''(x)$.