Due by 9am on November 10. Please upload your solutions to Canvas as one PDF file. Do not forget to attach the honor code. Each problem is worth 10 points. You must show all your work for full credit.

(1) Find the derivative.

(a) $f(x) = e^{(x^2+2x+3)^2}$

(b) $f(t) = \cos(te^{-2t})$

(c) $f(x) = \dfrac{e^{x^2}}{x}$

(d) $f(x) = (1 + e^x)^4$

(e) $f(x) = \tan(e^{5-6x})$

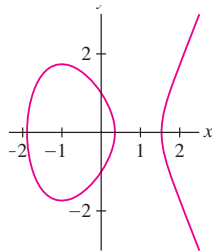(2) Find the derivative.

(a) $y = (\ln(\ln x))^3$

(b) $y = \ln((x+1)(2x+9))$

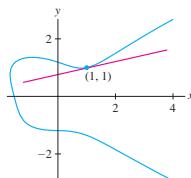(c) $y = \ln\left(\dfrac{x+1}{x^3+1}\right)$

(d) $y = 11^{\sin x}$

(e) $f(t) = \log_3(\sin t)$

(3) Find the points on the graph of $y^2 = x^3 - 3x + 1$ where the tangent line is horizontal.

(4) Find an equation of the tangent line at the point $P = (1,1)$ on the curve $y^4 + xy = x^3 - x + 2$.

(5) Calculate dy/dx at the point $(\frac{\pi}{4}, \frac{\pi}{4})$ on the curve

$$\sqrt{2}\,\cos(x+y) = \cos x - \cos y$$

(6) Find all points on the graph of $3x^2 + 4y^2 + 3xy = 24$ where the tangent line is horizontal.

(7) Find the derivative using logarithmic differentiation.

(a) $y = \sqrt{\dfrac{x(x+2)}{(2x+1)(3x+2)}}$

(b) $y = (2x+1)(4x^2)\sqrt{x-9}$

(8) Find the derivative.

(a) $y = x\tan^{-1} x$

(b) $y = e^{\cos^{-1} x}$

(c) $y = \tan^{-1}\left(\dfrac{1+t}{1-t}\right)$

(d) $y = (\tan^{-1} x)^3$

(e) $y = \csc^{-1}(x^{-1})$

(9) Find the derivative.

(a) $y = \cos^{-1}(x + \sin^{-1} x)$

(b) $y = \ln(\sin^{-1} x)$

(c) $y = \dfrac{\cos^{-1} x}{\sin^{-1} x}$

(d) $y = \cos^{-1}(\ln x)$

(e) $y = \cos^{-1} t^{-1} - \sec^{-1} t$

(10) Find $g'\left(-\frac{1}{2}\right)$, where $g(x)$ is the inverse of $f(x) = \dfrac{x^3}{x^2+1}$.