

Name:

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Q.1 [2.5pts] Let $f(x) = \begin{cases} 0, & x \leq 0 \\ 5 - x, & 0 < x < 4 \\ \frac{1}{5 - x}, & x \geq 4. \end{cases}$

Where is the function f **not** differentiable? Explain your answer.

Q.2 [2pts] Differentiate the following functions:

(a) $f(x) = x^{5/2}e^x$

(b) $y = \frac{x^2 - 2\sqrt{x}}{x}$

Q.3 [3pts] If $f(x) = \sec x$, find $f''(\pi/4)$.

Q.4 [2.5pts] Find the points on the curve $y = \frac{\cos x}{2 + \sin x}$ at which the tangent line is horizontal.

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Q.4 [2.5pts] Find equations of **tangent** line and **normal** line to the curve

$$y = \frac{\sqrt{x}}{x+1} \text{ at } (4, 0.4).$$