

- [1] 1. Find the domain of the function $g(x) = \frac{e^{\sqrt{1-2x}}}{x^2 - 9}$.
- [2] 2. Using the definition of the derivative, find $\frac{d}{dx}\sqrt{9-2x}$.
- [4] 3. Evaluate each of the limits. Show your work!
- a) $\lim_{x \rightarrow 2} \frac{x-2}{2x^2-4x}$
- b) $\lim_{x \rightarrow \infty} \frac{x^3-x-7}{2x^3+\sqrt{x}}$
- [2] 4. Suppose that $x^3 + x^2y - 2y^5 = 5$. Find $y' = \frac{dy}{dx}$ in terms of x and y .
- [2] 5. Let $f(x) = 2x^3 - x$. Find the equation of the line tangent to f at the point $x = 1$.
- [6] 6. Differentiate each of the following. Show your work! You do not need to simplify your answer.
- a) $u(t) = (t^2 + 5)^7(e^t + \pi)$
- b) $g(x) = \frac{\tan(x)}{x + 2^x}$.
- c) $w(r) = \ln(\sqrt{1-r^2})$.
- [2] 7. Use logarithmic differentiation to find the derivative of $f(x) = (x^2 + 2)^{\cos(x)-1}$. Give your answer in terms of x (not f), but you do not need to simplify.
- [3] 8. A rectangle is changing width and height continuously. When the width is 20cm and the area is 100cm^2 , the width is increasing at a rate of 3cm/s and the area is increasing at a rate of $10\text{cm}^2/\text{s}$. At this moment, what is the rate of change of the height?