Quiz 1

1. What is the derivative of $\log(1+x)$ with respect to x?

    1. $1/(1+x)$
    2. $1+x$
    3. $\log x$
    4. e^{1+x}
    5. None of the above

2. What is the derivative of $\frac{1}{2}e^{(x+2)^2}$ with respect to x?

    1. $e^{\frac{(x+2)^2}{2}}$
    2. $(x+2)e^{\frac{(x+2)^2}{2}}$
    3. $xe^{\frac{(x+2)^2}{2}}$
    4. $\frac{1}{2}e^{\frac{(x+2)^2}{2}}$
    5. None of the above

3. f is a smooth function of x and $\frac{df}{dx} = -2f$. What is f?

    1. x
    2. e^{-2x}
    3. e^{-x^2}
    4. $\log x$
    5. None of the above

4. Suppose

$$\phi = \sum_{i=1}^{N}(ax_i + b)^2 = (ax_1 + b)^2 + (ax_2 + b)^2 + \cdots + (ax_N + b)^2$$

    What is $\frac{\partial \phi}{\partial x_1}$?

    1. $2(ax_1 + b)$
    2. $ax_1 + b$
    3. $2a(x_1 + b)$
    4. $2ax_1$
    5. None of the above

5. The dimesion of matrix A is $m \times n$ (i.e. m rows and n columns). The dimension of matrix B is $n \times p$. What is the dimension of the product AB?

    1. $m \times p$
    2. $m \times n$
    3. $n \times n$
    4. $n \times p$
    5. None of the above