

Problem Set 1

Find the first $f'(x)$ and second $f''(x)$ derivatives of the function $f(x)$ where

1. $f(x) = \omega x$, $\omega = \text{const}$

2. $f(x) = \cos(kx)$, $k = \text{const}$

3. $f(x) = A \cos(\omega x)$, $A = \text{const}$, $\omega = \text{const}$

4. $f(x) = A \sin(kx) + B \cos(kx)$, $A = \text{const}$, $B = \text{const}$, $k = \text{const}$

5. $f(x) = A \exp\{-ikx\}$, $A = \text{const}$, $k = \text{const}$

6. $f(x) = A \exp\left\{\frac{ik}{\hbar}x\right\} + B \exp\left\{-\frac{ik}{\hbar}x\right\}$, $A = \text{const}$, $B = \text{const}$, $k = \text{const}$, $\hbar = \text{const}$