Worksheet III

Some Derivative Exercises

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Questions and Exercises

Let $D \subseteq \mathbb{R}$ and $C \subseteq \mathbb{R}$

1. Consider $k : D \longrightarrow C$ where $k(x) = 3 \cdot x^4 + 7 \cdot x^{-2} - 5$.
   Find $k'(x)$.

2. Consider $f : D \longrightarrow C$ where $f(x) = 3x^4 + 7x^{-2} - 5$.
   Find $f'(x)$ and find the slope of the tangent line to $f(x)$ when $x = 2$.

3. Consider $g : D \longrightarrow C$ where $g(x) = 3x^2 \cdot \sec x$.
   Find $g'(x)$ and find the equation of the tangent line to $g(x)$ when $x = \frac{\pi}{6}$.

4. Consider $h : D \longrightarrow C$ where $h(x) = \dfrac{3x^2 + 1}{x^2}$.
   Find $h'(x)$ and find the equation of the tangent line to $h(x)$ when $x = 6$.

5. Consider $j : D \longrightarrow C$ where $j(x) = \dfrac{x^2}{3x^2 + 1}$.
   Find $j'(x)$ and find the equation of the tangent line to $j(x)$ when $x = 6$.

6. Consider $w : D \longrightarrow C$ where $w(x) = \dfrac{3x^2 + 3x^4 - 5}{14x}$.
   Find $w'(x)$ and find the slope of the normal line to $w(x)$ when $x = 1$.

7. Consider $t : D \longrightarrow C$ where $t(x) = \dfrac{\tan x}{\sin x}$.
   Find $t'(x)$ and simplify or 'usefulfy' the result.

8. Consider $q : D \longrightarrow C$ where $q(x) = 3x^2 e^x \cos x$.
   Find $q'(x)$ and simplify or 'usefulfy' the result.