

Definition of the Derivative Homework 2
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Let our universe be $\mathbb{R} \times \mathbb{R}$ which is the Cartesian plane.

For all problems use the definition of the derivative to solve the following:

1. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ such that $f(x) = x^3$.
A. Find $f'(x)$. B. Find the equation of the tangent line to $f(x)$ at $(2, 8)$.
2. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ such that $f(x) = 4x^2 + 7$.
A. Find $f'(x)$. B. Find the equation of the tangent line to $f(x)$ at $(2, 23)$.
3. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ such that $f(x) = 3x - 8$.
A. Find $f'(x)$. B. Find the equation of the tangent line to $f(x)$ at $(2, -2)$.
4. Let $f : (-\infty, 0) \cup (0, \infty) \rightarrow \mathbb{R}$ such that $f(x) = \frac{3}{x^2}$.
A. Find $f'(x)$. B. Find the equation of the tangent line to $f(x)$ at $(2, \frac{3}{4})$.
5. Let $f : (-\infty, 0) \cup (0, \infty) \rightarrow \mathbb{R}$ such that $f(x) = \frac{x+1}{x^2}$.
Find $f'(x)$.

Try this (if you can't get it, fine):

6. Let $f : \left(-\frac{1}{2}, \infty\right) \rightarrow \mathbb{R}$ such that $f(x) = \sqrt{2x+1}$.
Find $f'(x)$.