1. [8 points] Consider the function
$$f(x) = 2x^3 + 5x.$$
Find an equation for the tangent line to the graph $y = f(x)$ at the point where $x = -1$.

2. [24 points] Evaluate the derivative of each function. You **do not need to simplify** your answers.
   (a) $\dfrac{2x+1}{3x+1}$
   (b) $\dfrac{2x^2 + 3\sqrt{x} + 5}{\sqrt{x}}$
   (c) $\sqrt{3 + (1+x)^4}$
   (d) $\dfrac{(2+3x)^2}{\sqrt{3-x}}$

3. [8 points] Let
$$f(x) = \sqrt{1+x^2}.$$
Use the **limit definition** of the derivative to find $f'(x)$.

4. [12 points] Consider the function
$$f(x) = \frac{x^2+1}{2x+1}.$$
   (a) Compute **and simplify** the derivative $f'(x)$.
   (b) Compute **and simplify** the second derivative $f''(x)$. Your final answer should be $\dfrac{10}{(2x+1)^3}$. For full credit, show each step of your simplification.

5. [8 points] At what points is the tangent line to the graph $y = (x+1)^2(2x-1)^3$ horizontal? For this problem, **it is enough to state the x-coordinate only** in your answer.

6. [3 points (bonus)] Evaluate and simplify
$$\frac{d}{dx}\sqrt{1 + (5 + \sqrt{x/6})^{12}}.$$