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14.3 Definition of Derivatives Part 2

1. In your own words, explain what a derivative is
2. State the limit definition of a derivative
3. Match the function (a-d) with the graph of its derivative (I-IV)
(a)

(b)

I

II

(c)

(d)

III

IV


For \#4-6, use the limit definition to find the derivative of the function
4. $f(x)=-2 x+4$
5. $\mathrm{f}(\mathrm{x})=\frac{1}{x}$
6. $\mathrm{f}(\mathrm{x})=\sqrt{x-2}$
7. Using $f(x)=-3 x^{2}$, predict if the slope of the tangent line will be positive or negative at $x=-3, x=0$, and $x=1$. Then find the actual slope of the tangent line at these points.
8. The function $h(t)=-16 t^{2}+60 t+80$ measures height in terms of time.
a) Find the average velocity from $t=[0,2]$
b) Find the derivative of the function
c) Using the derivative, find the instantaneous velocity at $t=0, t=1$, and $t=2$
9. Use the definition of the derivative to show that $f^{\prime}(0)$ does not exist where $f(x)=|x|$.
10. For the function $f(x)=x^{2}+2 x+1$, find the slope of the tangent line at $x=-3$

