

Practice Questions

1. For $y = 2x^3$, what is the average slope $= \frac{\Delta y}{\Delta x}$ from $x = 1$ to $x = 2$?
2. What is the instant slope of $y = 2x^3$ at $x = 1$?
3. $y = x^n$ has $\frac{dy}{dx} = nx^{n-1}$. What is $\frac{dy}{dx}$ when $y(x) = \frac{1}{x} = x^{-1}$?
4. For $y = x^{-1}$, what is the average slope $\frac{\Delta y}{\Delta x}$ from $x = \frac{1}{2}$ to $x = 1$?
5. What is the instant slope of $y = x^{-1}$ at $x = \frac{1}{2}$?

6. Suppose the graph of $y(x)$ climbs up to its maximum at $x = 1$
Then it goes downward for $x > 1$
 - 6A. What is the sign of $\frac{dy}{dx}$ for $x < 1$ and then for $x > 1$?
 - 6B. What is the instant slope at $x = 1$?
7. If $y = \sin x$, write an expression for $\frac{\Delta y}{\Delta x}$ at any point x .
We see later that this $\frac{\Delta y}{\Delta x}$ approaches $\cos x$

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Resource: Highlights of Calculus
Gilbert Strang

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