Practice Questions

1. For $y = 2x^3$, what is the average slope $= \dfrac{\Delta y}{\Delta x}$ from $x = 1$ to $x = 2$?

2. What is the instant slope of $y = 2x^3$ at $x = 1$?

3. $y = x^n$ has $\dfrac{dy}{dx} = nx^{n-1}$. What is $\dfrac{dy}{dx}$ when $y(x) = \dfrac{1}{x} = x^{-1}$?

4. For $y = x^{-1}$, what is the average slope $\dfrac{\Delta y}{\Delta x}$ from $x = \dfrac{1}{2}$ to $x = 1$?

5. What is the instant slope of $y = x^{-1}$ at $x = \dfrac{1}{2}$?

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 $\dfrac{dy}{dx}$ 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 $\dfrac{\Delta y}{\Delta x}$ at any point x.

We see later that this $\dfrac{\Delta y}{\Delta x}$ approaches $\cos x$

Resource: Highlights of Calculus
Gilbert Strang