Slope of the Secant Line

To find the slope of the secant line, we use the formula

\[ m_{sec} = \frac{f(x + \Delta x) - f(x)}{\Delta x} \]  \hspace{1cm} (1)

You need to know this formula. The \( x \) represents the starting point of your interval. The \( \Delta x \) is the distance from \( x \) to the end of your interval.

**Example 1** Identify the \( x \) and \( \Delta x \) for the interval \([2, 10]\)

**Solution 1** \( x \) is the start of the interval, so \( x = 2 \). \( \Delta x \) is the distance to the end of the interval, so \( \Delta x = 10 - 2 = 8 \).

**Example 2** Identify the \( x \) and \( \Delta x \) for the interval \([-3, 7]\)

**Solution 2** \( x \) is the start of the interval, so \( x = -3 \). \( \Delta x \) is the distance to the end of the interval, so \( \Delta x = 7 - (-3) = 10 \).

**Example 3** Find the slope of the secant line of \( f(x) = 2x - 3 \) for the interval \([2, 10]\)

**Solution 3** \( x \) is the start of the interval, so \( x = 2 \). \( \Delta x \) is the distance to the end of the interval, so \( \Delta x = 10 - 2 = 8 \). Now we plug into formula (1).

\[
\begin{align*}
m_{sec} &= \frac{f(x + \Delta x) - f(x)}{\Delta x} \\
&= \frac{f(10) - f(2)}{8} \\
&= \frac{[2(10) - 3] - [2(2) - 3]}{8} \\
&= \frac{17 - 1}{8} \\
&= \frac{16}{8} \\
&= 2
\end{align*}
\]

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