Finding limit of a function, binomial theorem, Limit and Riemannian Sum

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Finding Limit

$$
\begin{aligned}
&\lim_{x \to h} \frac{f(x+h) - f(x)}{x+h-x} \\
&= \lim_{x \to h} \frac{(x+h)^2 - x^2}{h} \\
&= \lim_{x \to h} \frac{x^2 + 2xh + h^2 - x^2}{h} \\
&= \lim_{x \to h} 2x + h \\
&\text{As } x \text{ approaches } h\text{, h approaches } 0 \\
&\therefore \lim_{x \to h} 2x + h = \lim_{h \to 0} 2x + h \\
&= 2x
\end{aligned}
$$

$$(a+b)^5 = \binom{5}{0}a^5 + \binom{5}{1}a^4b + \binom{5}{2}a^3b^2 + \binom{5}{3}a^2b^3 + \binom{5}{4}ab^4 + \binom{5}{5}b^5$$

Riemannian sum, limit and integration:

$$\int_{\pi}^{2\pi} \cos(x)dx$$

$$\begin{aligned}\Delta x &= \frac{b-a}{n} \\ &= \frac{2\pi - \pi}{n} \\ &= \frac{\pi}{n}\end{aligned}$$

$$\begin{aligned}x_i &= a + \Delta x.i \\ &= \pi + \frac{\pi i}{n}\end{aligned}$$

$$\lim_{n\to\infty} \sum_{i=1}^{n} \frac{\pi}{n}.\cos(\pi + \frac{\pi i}{n})dx$$