Taylor/Maclaurin Polynomials and Series

Let $y = f(x)$ be a function with derivatives of all orders in an interval I containing x_0.

Let $y = P_N(x)$ be the N^{th}-order Taylor polynomial of $y = f(x)$ about x_0.

Let $y = R_N(x)$ be the N^{th}-order Taylor remainder of $y = f(x)$ about x_0.

Let $y = P_\infty(x)$ be the Taylor series of $y = f(x)$ about x_0.

Let c_n be the n^{th} Taylor coefficient of $y = f(x)$ about x_0.

a. The formula for c_n is

$c_n \;=$ ☐

b. In open form (i.e., with $\ldots$ and without a $\sum$-sign)

$P_N(x) \;=$ ☐

c. In closed form (i.e., with a $\sum$-sign and without $\ldots$)

$P_N(x) \;=$ ☐

d. In open form (i.e., with $\ldots$ and without a $\sum$-sign)

$P_\infty(x) \;=$ ☐

e. In closed form (i.e., with a $\sum$-sign and without $\ldots$)

$P_\infty(x) \;=$ ☐

f. We know that $f(x) = P_N(x) + R_N(x)$. Taylor's BIG Theorem tells us that, for each $x \in I$,

$R_N(x) \;=$ ☐ for some c between ☐ and ☐ .

g. A Maclaurin series is a Taylor series with the center specifically specified as $x_0 =$ ☐ .