3. [10 points] For each of the following questions circle the correct answer.

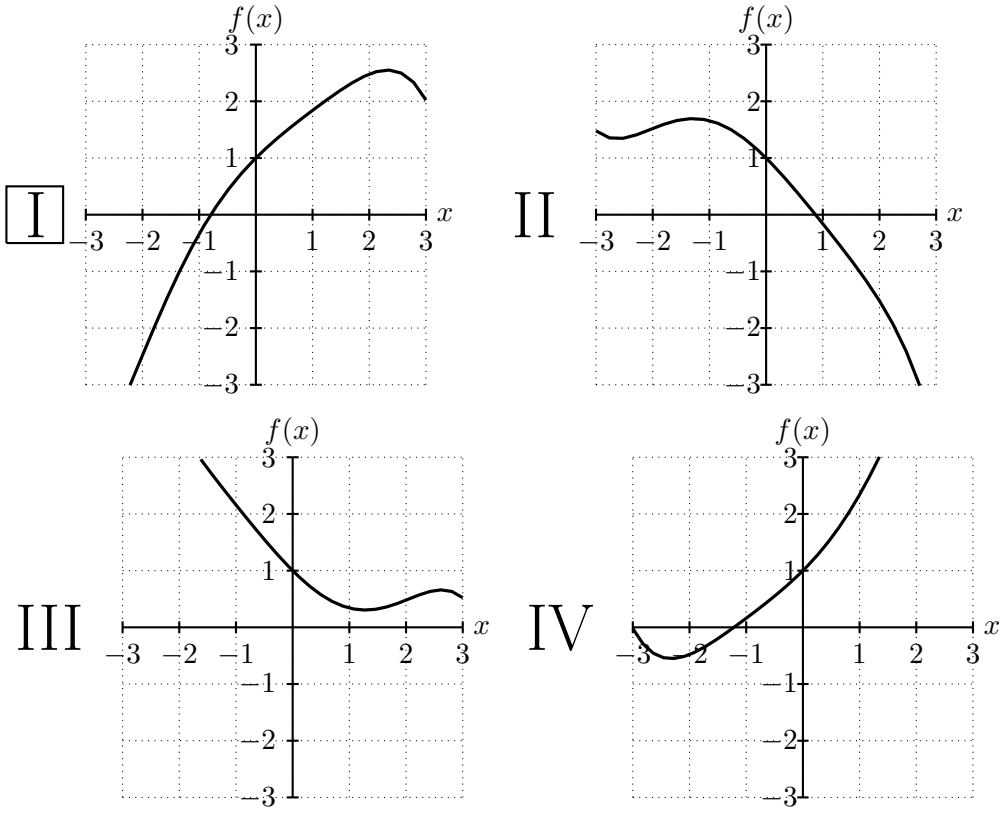
a. [2 points] What is the value of the series $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n 2^{2n}}{n!}$?

$\cos(2)$ $\quad$ e^{-2} $\quad$ $\cos(4)$ $\quad$ $\boxed{e^{-4}}$

b. [2 points] What is the value of the series $\displaystyle\sum_{n=1}^{\infty} \frac{2^{2n}(-1)^n}{(2n+1)!}$?

$\frac{1}{2}\sin(2)$ $\quad$ $\sin(2)-2$ $\quad$ $\sin(2)$ $\quad$ $\boxed{\frac{1}{2}(\sin(2)-2)}$

c. [2 points] Suppose that $1 + x - \frac{1}{4}x^2 + \frac{1}{10}x^3$ is the 3rd degree Taylor polynomial for a function $f(x)$. Which of the following pictures could be a graph of $f(x)$?



d. [2 points] What is the Taylor series of $2xe^{x^2}$ centered at $x = 0$?

$\boxed{\displaystyle\sum_{n=0}^{\infty} \frac{2x^{2n+1}}{n!}}$ $\quad$ $\displaystyle\sum_{n=1}^{\infty} \frac{2x^{2n-1}}{n!}$ $\quad$ $\displaystyle\sum_{n=1}^{\infty} \frac{2x^{2n+1}}{(n-1)!}$ $\quad$ $\displaystyle\sum_{n=0}^{\infty} \frac{2x^{2n-1}}{n!}$

e. [2 points] The radius of convergence of the Taylor series $\displaystyle\sum_{n=1}^{\infty} \frac{(x+5)^n 5^{-n}}{n+5}$ is $R = 5$. What is the interval of convergence of the series?

$\boxed{[-10, 0)}$ $\quad$ $(-10, 0)$ $\quad$ $(0, 10]$ $\quad$ $[-10, 0]$ $\quad$ $[0, 10)$