

This print-out should have 4 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

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**001 10.0 points**

Find the Taylor series centered at  $x = 0$  for

$$f(x) = \cos(4x).$$

1.  $\sum_{n=1}^{\infty} \frac{4^n}{(2n)!} x^{2n}$
2.  $\sum_{n=0}^{\infty} \frac{(-1)^n 4^{2n}}{(2n)!} x^{2n}$
3.  $\sum_{n=0}^{\infty} \frac{(-1)^n 4^{2n}}{(2n)!} x^n$
4.  $\sum_{n=0}^{\infty} \frac{(-1)^n 4^{2n}}{n!} x^n$
5.  $\sum_{n=0}^{\infty} \frac{(-1)^n 4^{2n}}{n!} x^{2n}$
6.  $\sum_{n=1}^{\infty} \frac{4^n}{(2n)!} x^n$

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**002 10.0 points**

Find the Taylor series representation for  $f$  centered at  $x = 1$  when

$$f(x) = 4 + 5x - 3x^2.$$

1.  $f(x) = 6 - (x - 1) - 3(x - 1)^2$
2.  $f(x) = 6 - (x - 1) - 6(x - 1)^2$
3.  $f(x) = 4 - (x - 1) + 6(x - 1)^2$
4.  $f(x) = 6 + 5(x - 1) + 3(x - 1)^2$
5.  $f(x) = 4 + 5(x - 1) - 6(x - 1)^2$
6.  $f(x) = 4 + 5(x - 1) - 3(x - 1)^2$

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**003 10.0 points**

Find the coefficient of  $x^4$  in the Taylor series expansion centered at the origin for the function

$$f(x) = 4 \ln(5 - 8x^2).$$

1. coefficient of  $x^4 = -\frac{128}{25}$
2. coefficient of  $x^4 = -\frac{8192}{25}$
3. coefficient of  $x^4 = -\frac{128}{625}$
4. coefficient of  $x^4 = \frac{32}{625}$
5. coefficient of  $x^4 = \frac{128}{25}$

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**004 10.0 points**

Find a power series representation centered at the origin for the function

$$f(x) = (6 + x)^{-3}.$$

1.  $\sum_{n=0}^{\infty} \frac{n+1}{6^{n+2}} x^n$
2.  $\sum_{n=0}^{\infty} (-1)^n \frac{(n+1)(n+2)}{6^{n+3}} x^n$
3.  $\sum_{n=0}^{\infty} (-1)^n \frac{n+1}{6^{n+2}} x^n$
4.  $\sum_{n=0}^{\infty} \frac{(n+1)(n+2)}{2 \cdot 6^{n+3}} x^n$
5.  $\sum_{n=0}^{\infty} \frac{n+1}{2 \cdot 6^{n+2}} x^n$
6.  $\sum_{n=0}^{\infty} (-1)^n \frac{(n+1)(n+2)}{2 \cdot 6^{n+3}} x^n$