1. (1 pt) Find $T_7(x)$: the Taylor polynomial of degree 7 of the function $f(x) = \arctan(x^2)$ at $a = 0$.
(You need to enter a function.)
$T_7(x) =$ ________

2. (1 pt) Find the Maclaurin series of the function $f(x) = 9\cos(6x^2)$

$(f(x) = \sum_{n=0}^{\infty} c_n x^n)$

$c_0 =$ ________
$c_2 =$ ________
$c_4 =$ ________
$c_6 =$ ________
$c_8 =$ ________

3. (1 pt) Match each of the Maclaurin series with correct function.

___1. $\sum_{n=0}^{\infty} (-1)^n \frac{2x^{2n+1}}{(2n+1)!}$

___2. $\sum_{n=0}^{\infty} \frac{2^n x^n}{n!}$

___3. $\sum_{n=0}^{\infty} \frac{(-1)^n 2^{2n} x^{2n}}{(2n)!}$

___4. $\sum_{n=0}^{\infty} \frac{(-1)^n 2x^{2n+1}}{2n+1}$

A. $2\arctan(x)$
B. $2\sin(x)$
C. $\cos(2x)$
D. e^{2x}

4. (1 pt) The Taylor series of function $f(x) = \ln(x)$ at $a = 9$ is given by:

$$f(x) = \sum_{n=0}^{\infty} c_n (x-9)^n$$

Find the following coefficients:
$c_0 =$ ________
$c_1 =$ ________
$c_2 =$ ________
$c_3 =$ ________
$c_4 =$ ________
Determine the interval of convergence: ________
Note: Give your answer in **interval notation**

5. (1 pt) The Taylor series for $f(x) = \sin(x)$ at $a = \frac{\pi}{2}$ is $\sum_{n=0}^{\infty} c_n (x - \frac{\pi}{2})^n$.
Find the first few coefficients.
$c_0 =$ ________
$c_1 =$ ________
$c_2 =$ ________
$c_3 =$ ________
$c_4 =$ ________

6. (1 pt) Find the Maclaurin series of the function $f(x) = (6x^2)e^{-5x}$.

$$f(x) = \sum_{n=0}^{\infty} c_n x^n$$

Determine the following coefficients:
$c_1 =$ ________
$c_2 =$ ________
$c_3 =$ ________
$c_4 =$ ________
$c_5 =$ ________

7. (1 pt) Evaluate

$$\lim_{x\to 0} \frac{e^{-3x^3} - 1 + 3x^3 - \frac{9}{2}x^6}{6x^9}$$

Hint: Use power series.
Answer: ________

8. (1 pt) Use the binomial series to expand the function $f(x) = \frac{1}{(1-4x)^{1/4}}$ as a power series

$$\sum_{n=0}^{\infty} c_n x^n$$

Compute the following coefficients.
$c_0 =$ ________
$c_1 =$ ________
$c_2 =$ ________
$c_3 =$ ________
$c_4 =$ ________