

9. [12 points] Read the following parts carefully, and circle the appropriate answer(s). Some parts may have more than one correct answer.

a. [3 points] Circle the value(s) of x for which the following identity holds:

$$2 = x^3 + \frac{x^6}{2!} + \frac{x^9}{3!} + \frac{x^{12}}{4!} + \dots$$

$\sqrt[3]{\ln(2)}$	$\sqrt[3]{\ln(3)}$	$(\ln(2))^3$
e^{2^3}	$\ln(\sqrt[3]{3})$	$e^{\sqrt[3]{3}}$

b. [3 points] Raymond Green's pet anaconda Sheela grew 5 m in length over the past month. The veterinarian says that each month, the increase in Sheela's length will be 40% of the increase the month before. How much longer (in meters) will Sheela be one year from now? Circle **all** that apply.

$\sum_{k=0}^{12} 5(0.4)^k$	$\frac{2(1 - (0.4)^{12})}{1 - 0.4}$	$\sum_{k=1}^{12} 5(0.4)^k$
$\frac{5(1 - (0.4)^{12})}{1 - 0.4}$	$\frac{2(1 - (0.4)^{13})}{1 - 0.4}$	

c. [3 points] Let $\alpha > 0$ be a constant. What is the value of the convergent series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1} \alpha^n}{(2n)!}$?

$\cos(\alpha) - 1$	$\cos(\sqrt{\alpha}) - 1$	$1 - \cos(\alpha)$
$\alpha - \cos(\sqrt{\alpha})$	$1 - \cos(\sqrt{\alpha})$	$\cos(\alpha) - \alpha$

d. [3 points] Which of the following series converge **absolutely**? Circle **all** that apply.

$\sum_{n=1}^{\infty} \frac{\sin^{99}(n)}{n^2}$	$\sum_{n=2}^{\infty} \frac{(-1)^{n+1}}{\ln(n)}$	$\sum_{n=2}^{\infty} \frac{8^n + (-1)^n 10^n}{9^n}$
$\sum_{n=2}^{\infty} \frac{(-1)^{n+1}}{n(\ln(n))^{1.01}}$	$\sum_{n=2}^{\infty} \frac{(-1)^n}{n}$	