4. (15 points) Circle "True" or "False" for each of the following statements. Circle "True" only if the statement is always true. No explanation is necessary.

(a) If $\lim_{n\to\infty} a_n = 0$, then $\sum_{n=0}^{\infty} a_n$ converges.

True. [False.]

(b) If $0 \le a_n \le b_n$ for all n, and if $\sum_{n=1}^{\infty} a_n$ diverges, then $\sum_{n=1}^{\infty} b_n$ diverges.

[True.] False.

(c) If $P_4(x) = 5 + 6(x-a) + 2(x-a)^2 + 37(x-a)^3 + 21(x-a)^4$ is the 4th degree Taylor polynomial for $f(x)$ about $x = a$, then $f^{(3)}(a) = 37$.

True. [False.]

(d) If the power series $\sum_{n=0}^{\infty} C_n(x-3)^n$ converges for $x = 1$, then it also converges for $x = 4$.

[True.] False.

(e) The infinite series $\sum_{n=1}^{\infty} \frac{3n^2+n}{n^5+3}$ converges.

[True.] False.

5. (5 points) Express the number x whose repeating decimal expansion is 6.17636363636363... as the sum of an infinite series.

$$\begin{aligned} 6.17636363636\overline{363} &= 6.17 + \frac{63}{10,000} + \frac{63}{1,000,000} + \frac{63}{100,000,000} + \dots \\ &= 6.17 + 63\sum_{n=2}^{\infty} \frac{1}{100^n} \\ &= 6.17 + \frac{63}{100}\sum_{n=1}^{\infty} \frac{1}{100^n}. \end{aligned}$$