

8. [10 points] For each of the questions below, write out on your paper **all** the answers which are **always** true. No explanation is needed.

a. [3 points] Given that the power series  $\sum_{n=0}^{\infty} C_n(x-1)^n$  converges at  $x = 3$  and diverges at  $x = 8$ , at which of the following  $x$ -value(s) **must** the series **converge**?

-7      -6      -3      -1      0      2      6      9      NONE OF THESE

b. [3 points] Note: This part has the same set up as (a), but asks about divergence. Given that the power series  $\sum_{n=0}^{\infty} C_n(x-1)^n$  converges at  $x = 3$  and diverges at  $x = 8$ , at which of the following  $x$ -value(s) **must** the series **diverge**?

-7      -6      -3      -1      0      2      6      9      NONE OF THESE

c. [4 points] Let  $x = f(t)$ ,  $y = g(t)$  (where  $0 \leq t \leq 10$ ) be a parametric curve such that  $y = x^2$ . Which of the following must be true?

(i) If  $V$  is the **speed** of the curve at  $t = 4$ , then  $V \geq f'(4)$ .

(ii)  $f'(t) \geq 0$  for  $0 < t < 10$ .

(iii)  $g(t) \geq 0$  for  $0 < t < 10$ .

(iv) The tangent line to the curve at  $t = 1$  is  $y = 2x - 1$ .

(v) NONE OF THE ABOVE