

8. [11 points] A function  $g(t)$  and its derivative are given by

$$g(t) = 10e^{-0.5t}(t^2 - 2t + 2) \quad \text{and} \quad g'(t) = -10e^{-0.5t}(0.5t^2 - 3t + 3).$$

- a. [2 points] Find the  $t$ -coordinates of all critical points of  $g(t)$ . If there are none, write NONE. For full credit, you must find the exact  $t$ -coordinates.

**Answer:** Critical point(s) at  $t =$  \_\_\_\_\_

- b. [6 points] For each of the following, find the values of  $t$  that maximize and minimize  $g(t)$  on the given interval. Be sure to show enough evidence that the points you find are indeed global extrema. For each answer blank, write NONE in the answer blank if appropriate.

- (i) Find the values of  $t$  that maximize and minimize  $g(t)$  on the interval  $[0, 8]$ .

**Answer:** Global max(es) at  $t =$  \_\_\_\_\_ Global min(s) at  $t =$  \_\_\_\_\_

- (ii) Find the values of  $t$  that maximize and minimize  $g(t)$  on the interval  $[4, \infty)$ .

**Answer:** Global max(es) at  $t =$  \_\_\_\_\_ Global min(s) at  $t =$  \_\_\_\_\_

- c. [3 points] Let  $G(t)$  be the antiderivative of  $g(t)$  with  $G(0) = -5$ . Find the  $t$ -coordinates of all critical points and inflection points of  $G(t)$ . For each answer blank, write NONE if appropriate. You do not need to justify your answers.

**Answer:** Critical point(s) at  $t =$  \_\_\_\_\_

**Answer:** Inflection point(s) at  $t =$  \_\_\_\_\_