

7. [12 points] The parts of this problem are unrelated to each other.
- a. [7 points] **Compute** the value of the following improper integral if it converges. If it does not converge, use a **direct computation** of the integral to show its divergence. Be sure to show your full computation, and be sure to use **proper notation**.

$$\int_1^2 \frac{1}{\sqrt{t-1}} dt$$

- b. [5 points] Compute the following limit. Fully justify your answer including using proper notation.

$$\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{x^2}$$