

5. [10 points] For each of the problems below, fill in the letter (A-I) corresponding to the answer from the list of answer choices below which correctly finishes the sentence. If none of those options is correct, choose “NONE OF THESE”. Note that answer choices may be used more than once.

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**Answer Choices:**

- |             |             |                  |
|-------------|-------------|------------------|
| A. equals 0 | D. equals 3 | G. equals 6      |
| B. equals 1 | E. equals 4 | H. equals 7      |
| C. equals 2 | F. equals 5 | I. diverges      |
|             |             | J. NONE OF THESE |
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a. [2 points] The integral  $\int_0^{\infty} 5xe^{-x} dx$

**Answer:** \_\_\_\_\_

b. [2 points] The series  $(e-1) - \frac{(e-1)^2}{2} + \frac{(e-1)^3}{3} + \dots + (-1)^{n-1} \frac{(e-1)^n}{n} + \dots$

**Answer:** \_\_\_\_\_

c. [2 points] The arclength of the polar curve  $r = \frac{\sin(\theta)}{\pi}$

**Answer:** \_\_\_\_\_

d. [2 points] The TRAP(2) estimate for the integral  $\int_0^1 8x^2 dx$

**Answer:** \_\_\_\_\_

e. [2 points] The series  $\sum_{n=3}^{\infty} \left( \frac{12}{n} - \frac{12}{n+2} \right)$

**Answer:** \_\_\_\_\_