

5. [14 points]

a. [7 points] Determine whether the following improper integral is convergent or divergent.

**Fully justify** your answer including using **proper notation** and **showing mechanics** of any tests you use. You do not need to compute the value of the integral if it is convergent.

Circle your final answer choice.

$$\int_1^{\infty} \frac{4 + \sin(x)}{x^3 + 2} dx$$

Circle one:      **Convergent**      **Divergent**

b. [7 points] Let  $0 < p < 1$  be a real number, and consider the improper integral

$$\int_1^3 \frac{1}{t(\ln(t))^p} dt.$$

The integral above converges; to show this, **compute** its value. Your answer may involve  $p$ .

Be sure to show your full computation, and be sure to use **proper notation**.

Remember:  $0 < p < 1$ .

**Answer:**  $\int_1^3 \frac{1}{t(\ln(t))^p} dt =$  \_\_\_\_\_