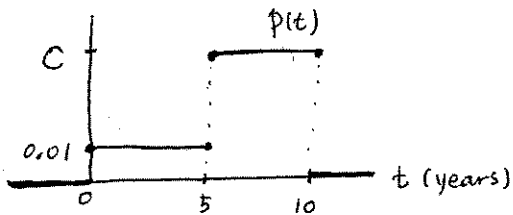


HONOR 2201, CALCULUS FOR NON-SCIENCE MAJORS, QUIZ 9, 12/02/05

Name: Solution

Student ID #: _____

1-3. A machine lasts up to 10 years. The figure shows the density function $p(t)$ for the length of time it lasts.



1.(5 pts) What is the value of c ?

$$\int_{-\infty}^{\infty} p(t) dt = 1 \Leftrightarrow \int_0^5 p(t) dt + \int_5^{10} p(t) dt = 1.$$

$$\Leftrightarrow 5 \cdot (0.01) + 5 \cdot (c) = 1 \quad \Leftrightarrow \begin{aligned} 5c &= 1 - 0.05 \\ 5c &= 0.95 \\ c &= \frac{0.95}{5} = 0.19 \end{aligned}$$

$$\Rightarrow \boxed{c = 0.19}$$

2.(5 pts) What fraction of the machines last between 3 and 6 years?

$$\begin{aligned} \int_3^6 p(t) dt &= \int_3^5 p(t) dt + \int_5^6 p(t) dt \\ &= 2 \cdot (0.01) + 1 \cdot (c) \\ &= 2 \cdot (0.01) + 1 \cdot (0.19) \end{aligned}$$

$$\boxed{\begin{aligned} &= 0.21 \\ & (= 21\%) \end{aligned}}$$

3.(5 pts) What is the probability that the machines last longer than 8 years?

$$\int_8^{\infty} p(t) dt = \int_8^{10} p(t) dt = 2 \cdot (c) = 2 \cdot (0.19) = \boxed{0.38 = 38\%}$$