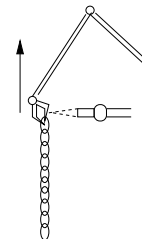


1. Consider a plastic chain lifted by a mechanical arm, as suggested in the figure to the right. The chain weighs 2 g/cm and is 10 cm long. As it is lifted, a paint sprayer sprays a thick coat of fast-drying paint on it. The paint adds 0.1 g/cm to the weight of the chain. How much work is done by the mechanical arm to lift the chain 10 cm, thereby coating the entire chain? (Use calculus to find the total work. Note that in cgs units, the acceleration due to gravity, $g = 981 \text{ cm/s}^2$ and force is measured in dynes.) (4 points)



2. Consider the function

$$g(x) = \begin{cases} 0, & x < 0 \\ \frac{1}{3}, & 0 \leq x < 1 \\ 1 - \frac{1}{3}x, & 1 \leq x \leq 3 \\ 0, & x > 3 \end{cases}$$

Is this a pdf or cdf? Why? What is the average value of x for the population this describes? (3 points)

3. Suppose that the college GPA, x , earned by squirrels living on the University of Michigan campus (which further their education by periodically enrolling in classes—you may have seen them, especially in humanities courses) is described by the density function $p(x)$. Let $P(t)$ be the cumulative distribution function corresponding to this. (3 points)
- If $p(2) = 0.05$, what percentage of squirrels have GPAs between 1.9 and 2.1?
 - If in addition $P(2) = 0.75$, estimate $P(1.9)$.
 - If $p(x)$ is a normal distribution with mean 2.3, is $p(2)$ greater or less than $p(2.3)$?