

Name: Section A02

1. (10 points) Suppose that a random variable, X has the following function distribution:

$$F(x) = \begin{cases} 0 & \text{if } x < 0 \\ x^2 & \text{if } 0 \leq x < \frac{1}{2} \\ x & \text{if } \frac{1}{2} \leq x < 1 \\ 1 & \text{if } x \geq 1 \end{cases}$$

Let $X = Y^2$ and compute the following:

(a) $P(-1 \leq X \leq \frac{1}{2}) = F(\frac{1}{2}) - \lim_{y \uparrow -1} F(y) = \frac{1}{2} - 0 = \boxed{\frac{1}{2}}$

(b) $P(Y \leq X)$

Not enough information in the problem to compute, since it depends on $P(Y < 0)$ which we don't know.

(c) $P(Y = \frac{1}{4}) = P(X = \frac{1}{16}) = 0$