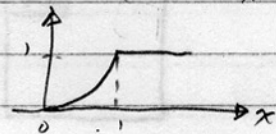


$\{X \leq x\}$ is a circle of radius 1 centered at the origin

b) $P[\{X \leq x\}] = \frac{\pi x^2}{\pi} = x^2$ for $0 \leq x \leq 1$ so $F_X(x) = \begin{cases} 0 & x < 0 \\ x^2 & 0 \leq x \leq 1 \\ 1 & x > 1 \end{cases}$

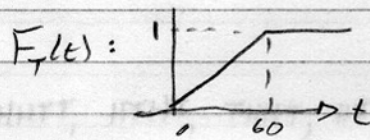
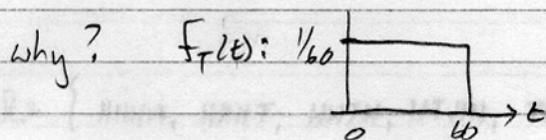
(Note: Υ here is $\mathbb{B}(\mathbb{R}^2) \cap$ unit circle)



5) $P[A] = 30/60$, $P[B] = 31/60$, $P[AB] = 1/60$

$P[B|A] = P[AB]/P[A] = \frac{1}{60} \cdot \frac{60}{30} = 1/30$

$P[A|B] = P[AB]/P[B] = \frac{1}{60} \cdot \frac{60}{31} = 1/31$



$P[A] = 1 - F_T(30)$, $P[B] = F_T(31)$, $P[AB] = F_T(31) - F_T(30)$

6) $\Omega = [-10, 10]$

a) continuous: say $\Upsilon = \mathbb{B}(\mathbb{R}) \cap [-10, 10]$

then one choice for X is $X(\omega) = \begin{cases} 2\omega & \text{for } \omega \in [-10, 0] \\ \omega & \text{for } \omega \in (0, 10] \end{cases}$

b) discrete: could do $\Upsilon = \{\emptyset, \Omega, [-10, 0], (0, 10]\}$

then one choice for X is $X(\omega) = \begin{cases} -1 & \text{if } \omega = [-10, 0] \\ 1 & \text{if } \omega = (0, 10] \end{cases}$