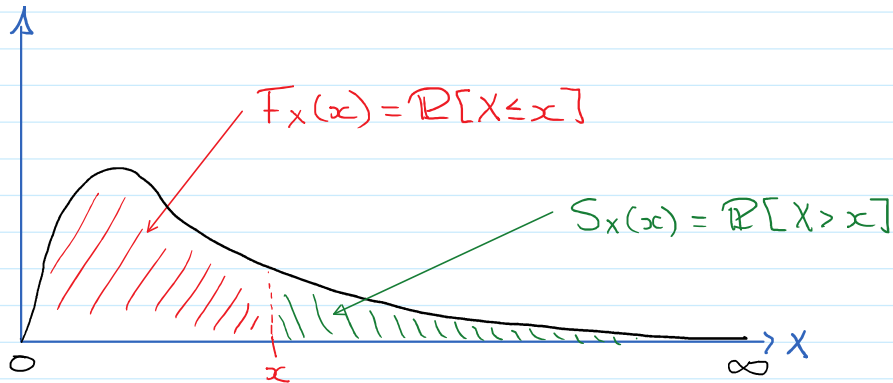
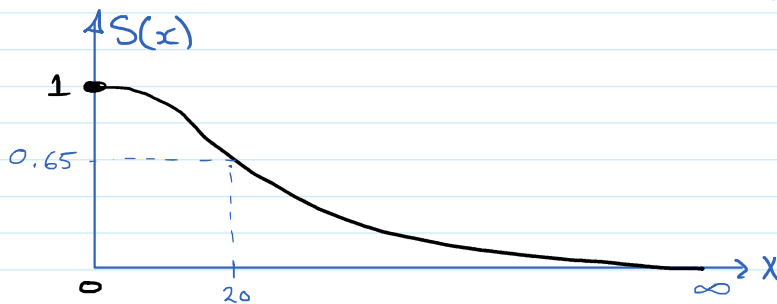


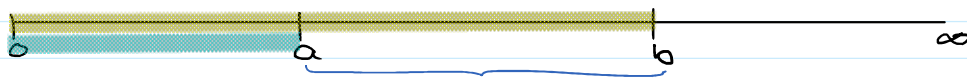


La función de supervivencia tendrá gráficas:

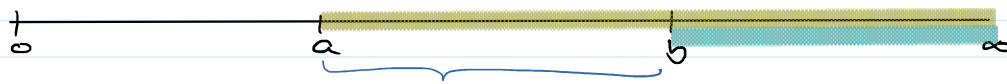


Para el cálculo de probabilidades:

$$\mathbb{P}[a < X \leq b] = F(b) - F(a)$$



Equivalentemente



$$\mathbb{P}[a < X \leq b] = S(a) - S(b)$$

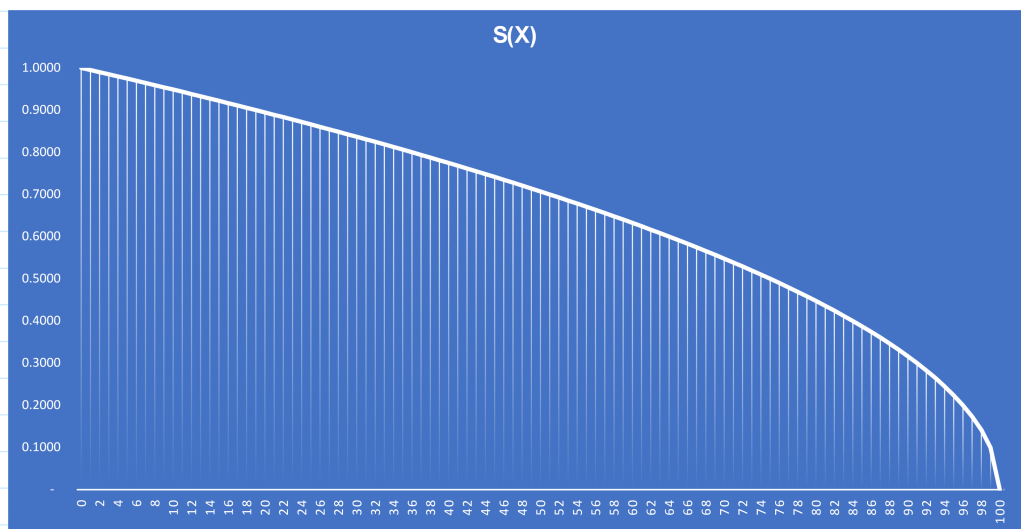
Nota:

$$\mathbb{P}[\underbrace{X > x+t}_A | \underbrace{X > x}_B] \stackrel{\text{Def}}{=} \frac{\mathbb{P}[(X > x+t) \cap (X > x)]}{\mathbb{P}[X > x]} = \frac{\mathbb{P}[X > x+t]}{\mathbb{P}[X > x]} = \frac{S(x+t)}{S(x)}$$



Ejercicio 01

a)



b)

$$F(x) = 1 - S(x) = 1 - \sqrt{\frac{100-x}{100}}$$

Probabilidad de que $X \leq x$
(no sobrevivir a edad x)

c) i) $\mathbb{P}[X > 65] = S(65) = \sqrt{\frac{100-65}{100}} = 0.5916$

ii) $\mathbb{P}[65 \leq X < 80] = S(65) - S(80) = F(80) - F(65)$

$$= \sqrt{\frac{100-65}{100}} - \sqrt{\frac{100-80}{100}} = 0.1444$$

iii) $\mathbb{P}[X < 80] = F(80) = 1 - S(80) = 1 - \sqrt{\frac{100-80}{100}} = 0.5528$

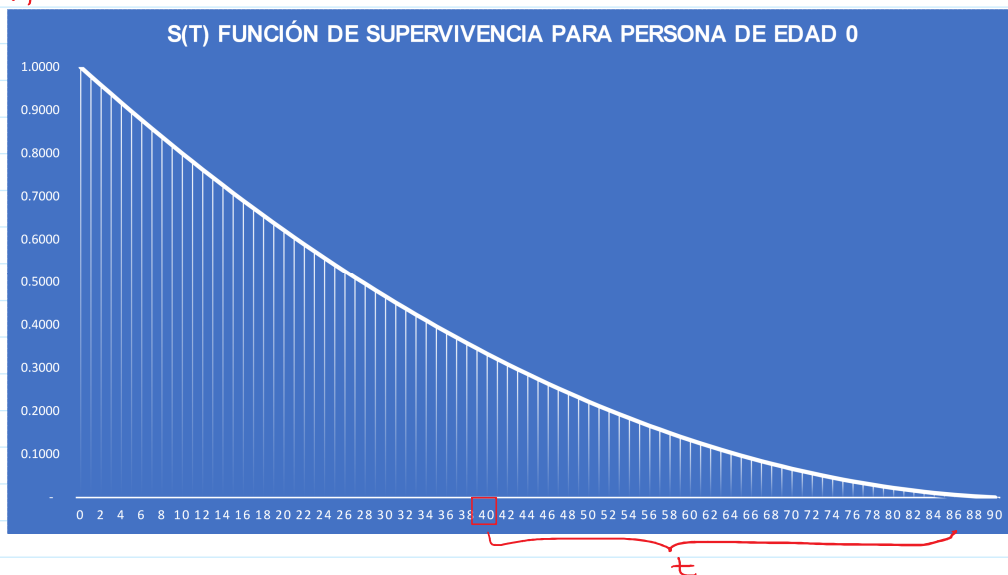
d) $\mathbb{P}[45 < X \leq 70 | X > 20] = \frac{\mathbb{P}[(45 < X \leq 70) \cap (X > 20)]}{\mathbb{P}[X > 20]}$

$$\begin{aligned}
 &= \frac{\mathbb{P}[45 < X \leq 70]}{\mathbb{P}[X \geq 20]} \\
 &= \frac{S(45) - S(70)}{S(20)} \\
 &= 0.2168 //
 \end{aligned}$$

$\swarrow 0.7416$ $\swarrow 0.5472$
 $\nwarrow 0.8944$

Ejercicio 02

1)



$$S(t) = \frac{t^2 - 190t + 9000}{9000}$$

$$S(60) = \mathbb{P}[T > 60] = (60)^2 - 190(6) + 9000 / 9000 = 0.1333$$

2) $\mathbb{P}[T > t \mid T \geq 40]$ X

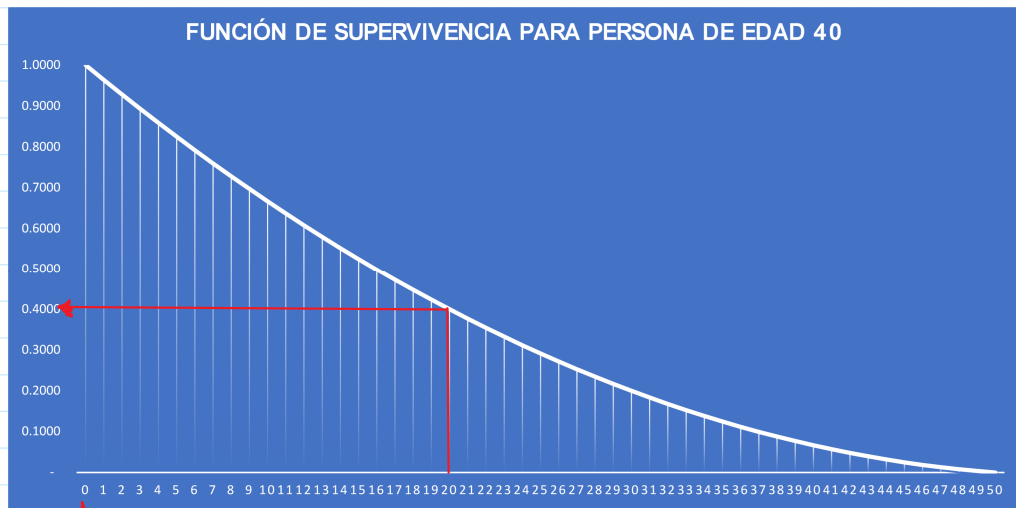
↳ Deben de ser t años más

$$\mathbb{P}[T > 40+t \mid T \geq 40] = \frac{S(40+t)}{S(40)}$$

$$= \frac{((40+t)^2 - 190(40+t) + 9000) / 9000}{(40^2 - 190(40) + 9000) / 9000}$$

$$= \frac{(40+t)^2 - 190(40+t) + 9000}{3000}$$

para $t \leq 50$



Función de supervivencia de la persona de edad 40

$$c) \mathbb{P}[T \geq 60 | T \geq 40] = \mathbb{P}[T \geq 40 + 20 | T \geq 40] = \frac{S(60)}{S(40)}$$

↑
t

$$= 0.4 //$$

Podemos ver que $\mathbb{P}[T > 60] = 0.1333$, mientras que $\mathbb{P}[T > 60 | T \geq 40] = 0.4$. Esto es, la probabilidad de sobrevivir aumenta dado que llegó con vida a los 40 años.