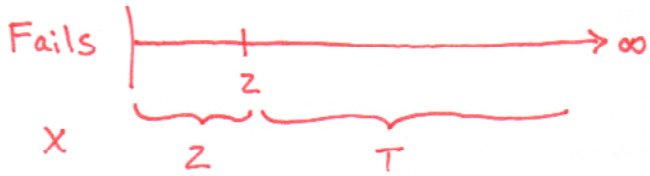


Problem 4b

$$X = \max(2, T)$$



$$T \sim \text{Exponential} (\lambda = \frac{1}{3})$$
$$f(t) = \frac{1}{3} \cdot e^{-\frac{t}{3}}$$

$$E(x) = A + B$$

$$A = \int_0^2 2 \cdot f(t) \cdot dt = -2 \cdot e^{-\frac{t}{3}} \Big|_0^2$$
$$= -2 \cdot e^{-\frac{2}{3}}$$

$$B = \int_2^{\infty} \frac{t}{3} \cdot e^{-\frac{t}{3}} \cdot dt$$
$$= t(-e^{-\frac{t}{3}}) \Big|_2^{\infty} + \int_2^{\infty} e^{-\frac{t}{3}} \cdot dt$$
$$= 2 + 2 \cdot e^{-\frac{2}{3}} + 3 \cdot e^{-\frac{2}{3}}$$

Using integration by parts

$$E(x) = -2 \cdot e^{-\frac{2}{3}} + 2 + 2 \cdot e^{-\frac{2}{3}} + 3 \cdot e^{-\frac{2}{3}}$$
$$= 2 + 3 \cdot e^{-\frac{2}{3}}$$

□