

Assignment 26

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Part 1

(a)

$$\frac{a+b}{2} = \frac{0+20}{2} = 10, \text{ 8:30 is the expected time}$$

(b)

$$\frac{a+b}{2} = \frac{0+10}{2} = 5, \text{ 8:35 is the expected time}$$

(c)

$$\int_0^{10} \frac{1}{20} dx = x \frac{1}{20} \Big|_{x=0}^{x=10} = \frac{1}{2}$$

(d)

$$\int_0^0 \frac{1}{10} dx = 0$$

Part 2

(a)

$$\frac{1}{\lambda} = \frac{1}{4}$$

(b)

$$\int_1^{\infty} 4e^{-4x} dx = -e^{-4x} \Big|_{x=1}^{x=\infty} = 0 - (-e^{-4}) = e^{-4}$$

(c)

$$\int_0^s 4e^{-4x} dx = 0.99999$$

$$-e^{-4x} \Big|_{x=0}^{x=s} = 0.99999$$

$$-e^{-4s} + 1 = 0.99999$$

$$e^{-4s} = 0.00001$$

$$s = 2.88$$

(d)

$$60 * 60 * 24 = 86,400$$

$$, \int_0^{86,400} 4e^{-4x} dx = -e^{-4x} \Big|_{x=0}^{x=86,400} = 1$$

It is an irrational fear, as you have a very small chance of getting stuck