Answers to 2004 Spring Semester Sample Second Exam

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1.

(a) e^{-3},

(b) $\mathrm{e}^{-\frac{3}{2}}$,

(c) $\frac{\ln 2}{3}$.

2.
50 people.

3.

$$f_Y(y) = \begin{cases} \lambda \mathrm{e}^{-\lambda y} & \text{for } y > 0, \\ 0 & \text{for } y \le 0, \end{cases}$$

hence Y is exponentially distributed with parameter λ.

4.
$\frac{1}{4}$.

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1.
$\ln 10$.

2.
At least 661 times.

3.

$$f_Y(y) = \frac{1}{\sqrt{2\pi}} \cdot \mathrm{e}^{-\frac{y^{2/3}}{2}} \cdot \frac{1}{3y^{2/3}} \qquad (y \in \mathbb{R}\backslash\{0\}).$$

4.

(a)

$$F_D(d) = \begin{cases} 0 & \text{for } d < 0, \\ 2d - d^2 & \text{for } 0 \le d \le 1, \\ 1 & \text{for } d > 1, \end{cases}$$

(b)

$$f_D(d) = \begin{cases} 0 & \text{for } d < 0, \\ 2 - 2d & \text{for } 0 \le d \le 1, \\ 0 & \text{for } d > 1, \end{cases}$$

(c) $\mathbb{E}D = \frac{1}{3}$.