(1) $X \sim$ time to check out book (hours)

$$f(x) = \begin{cases} .5x & 0 \le x \le 2 \\ 0 & o/w \end{cases}$$

PDF

a. $P(X \le 1) = \int_0^1 \frac{x}{2}\,dx = \frac{x^2}{4}\Big|_0^1 = \underline{\underline{\frac{1}{4}}}$ ANS

b. $P(.5 \le x \le 1.5) = \int_{.5}^{1.5} \frac{x}{2}\,dx = \underline{\underline{\frac{1}{2}}}$ ANS

c. $P(1.5 < x) = \int_{1.5}^{2} \frac{x}{2}\,dx = \underline{\underline{\frac{7}{16}}}$ ANS

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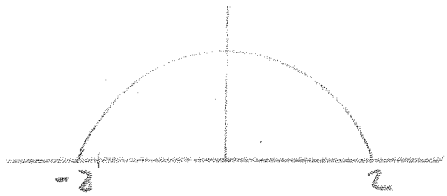
(3) $X \sim$ error in measurement

$$f(x) = \begin{cases} 0.09375(4-x^2) & -2 \le x \le 2 \\ 0 & o/w \end{cases}$$

a. SKETCH

PDF



b. $P(x > 0) = \int_0^2 f(x)\,dx = \underline{\underline{0.5}}$ ANS

c. $P(-1 < x < 1) = \int_{-1}^{1} f(x)\,dx = \underline{\underline{0.6875}}$ ANS

d. $P(x < -.5 \text{ or } X > .5) = P(x < -.5) + P(x > .5)$

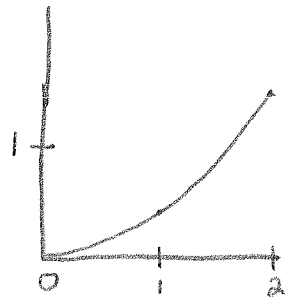
$$= \int_{-2}^{-.5} f(x)\,dx + \int_{.5}^{2} f(x)\,dx = \underline{\underline{0.6328}}$$ ANS

(5) $X \sim$ time between period end and lecture end (min)

$$f(x) = \begin{cases} kx^2 & 0 \le x \le 2 \\ 0 & o/w \end{cases}$$

a. $\int_0^2 f(x)\,dx = 1 \Rightarrow k\int_0^2 x^2\,dx = 1$

$$k = \frac{1}{\int_0^2 x^2\,dx} = \underline{\underline{\frac{3}{8}}}_{ANS}$$



b. $\int_0^1 \frac{3x^2}{8}\,dx = \underline{\underline{\frac{1}{8}}}_{ANS}$

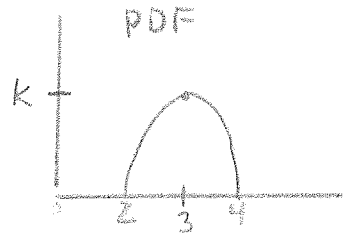
c. $\int_1^{1.5} f(x)\,dx = \underline{\underline{0.2968}}_{ANS}$

d. $\int_{1.5}^{2} f(x)\,dx = \underline{\underline{0.5781}}_{ANS}$

(6) $X \sim$ tracking weight (g)

$$f(x) = \begin{cases} k[1-(x-3)^2] & 2 \le x \le 4 \\ 0 & o/w \end{cases}$$

a. SKETCH



b. $k\int_2^4 1-(x-3)^2\,dx = 1 \quad k = \underline{\underline{\frac{3}{4}}}_{ANS}$

c. $\int_3^4 f(x)\,dx = \underline{\underline{\frac{1}{2}}}_{ANS} \qquad P(X>3)$

d. $\int_{2.75}^{3.25} f(x)\,dx = \underline{\underline{0.3671}}_{ANS} \qquad P(2.75 \le X \le 3.25)$

e $\int_{3.5}^{4} f(x)\,dx + \int_2^{2.5} f(x)\,dx = \underline{\underline{0.3125}}_{ANS} \qquad P(X>3.5) + P(X<2.5)$