

Solutions

Each answer shows the steps, then the **result**.

2.1

- $E(X) = \int_0^2 x \cdot \frac{1}{2}x \, dx = \left[\frac{x^3}{6} \right]_0^2 = \frac{4}{3}$

2.2

- $f(x) = F'(x)$

3.1 B

- The median solves $F(m) = 0.5$

3.2

(a)

- $\int_0^3 kx^2 \, dx = \left[\frac{kx^3}{3} \right]_0^3 = 9k = 1 \Rightarrow k = \frac{1}{9}$

(b)

- $E(X) = \int_0^3 x \cdot \frac{1}{9}x^2 \, dx = \frac{1}{9} \left[\frac{x^4}{4} \right]_0^3 = \frac{1}{9} \cdot \frac{81}{4} = \frac{9}{4}$

3.3

(a)

- $f(x) = F'(x) = \frac{x}{8}$ for $0 \leq x \leq 4$

(b)

- $\frac{m^2}{16} = 0.5 \Rightarrow m^2 = 8 \Rightarrow m = 2\sqrt{2} = 2.83$