

Edexcel (U.K.) Pre 2017

Questions By Topic

S2 Chap03 Continuous Random Variables

Compiled By: Dr Yu

Editors: Betül, Signal, Vivian

www.CasperYC.club

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DrYuFromShanghai@QQ.com

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8. The continuous random variable X has probability density function $f(x)$ given by

$$f(x) = \begin{cases} 2(x-2) & 2 \leq x \leq 3 \\ 0 & \text{otherwise} \end{cases}$$

(a) Sketch $f(x)$ for all values of x . (3)

(b) Write down the mode of X . (1)

Find

(c) $E(X)$, (3)

(d) the median of X . (4)

(e) Comment on the skewness of this distribution. Give a reason for your answer. (2)

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8. The continuous random variable X has probability density function given by

$$f(x) = \begin{cases} \frac{1}{6}x & 0 < x \leq 3 \\ 2 - \frac{1}{2}x & 3 < x < 4 \\ 0 & \text{otherwise} \end{cases}$$

- (a) Sketch the probability density function of X . (3)
- (b) Find the mode of X . (1)
- (c) Specify fully the cumulative distribution function of X . (7)
- (d) Using your answer to part (c), find the median of X . (3)

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7. The continuous random variable X has probability density function given by

$$f(x) = \begin{cases} \frac{3}{32}(x-1)(5-x) & 1 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}$$

(a) Sketch $f(x)$ showing clearly the points where it meets the x -axis. (2)

(b) Write down the value of the mean, μ , of X . (1)

(c) Show that $E(X^2) = 9.8$ (4)

(d) Find the standard deviation, σ , of X . (2)

The cumulative distribution function of X is given by

$$F(x) = \begin{cases} 0 & x < 1 \\ \frac{1}{32}(a - 15x + 9x^2 - x^3) & 1 \leq x \leq 5 \\ 1 & x > 5 \end{cases}$$

where a is a constant.

(e) Find the value of a . (2)

(f) Show that the lower quartile of X , q_1 , lies between 2.29 and 2.31 (3)

(g) Hence find the upper quartile of X , giving your answer to 1 decimal place. (1)

(h) Find, to 2 decimal places, the value of k so that

$$P(\mu - k\sigma < X < \mu + k\sigma) = 0.5 \quad (2)$$
