

AQA – Continuous random variables – A2 Further Mathematics Statistics

1. June/2020/Paper_3/No.1

The continuous random variable X has probability density function

$$f(x) = \begin{cases} \frac{1}{5} & 1 \leq x \leq 6 \\ 0 & \text{otherwise} \end{cases}$$

Find $P(X \geq 3)$

Circle your answer.

[1 mark]

$\frac{1}{5}$

$\frac{2}{5}$

$\frac{3}{5}$

$\frac{4}{5}$

- (b) A 6 metre clothes line is connected between the point P on one building and the point Q on a second building.

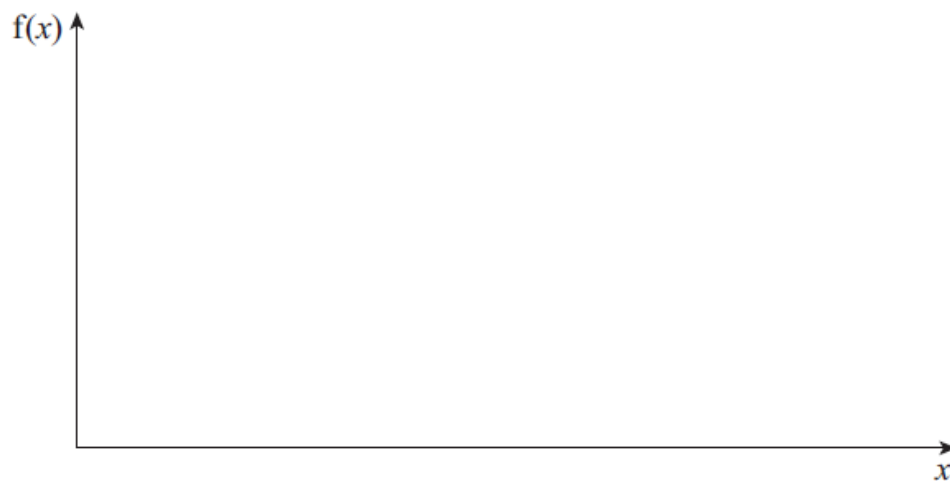
Roy is concerned the clothes line may break. He uses the random variable X to model the distance in metres from P where the clothes line breaks.

- (b) (i) State a criticism of Roy's model.

[1 mark]

- (b) (ii) On the axes below, sketch the probability density function for an alternative model for the clothes line.

[1 mark]



4. June/2019/Paper_3/No.5

An insurance company models the claims it pays out in pounds (£) with a random variable X which has probability density function

$$f(x) = \begin{cases} \frac{k}{x} & 1 < x < a \\ 0 & \text{otherwise} \end{cases}$$

- (a) The median claim is £200

Show that $k = \frac{1}{2 \ln 200}$

[3 marks]

- (b) Find $P(X < 2000)$, giving your answer to three significant figures.

[2 marks]

- (c) The insurance company finds that the maximum possible claim is £2000 and they decide to refine their probability density function.

Suggest how this could be done.

[2 marks]
