5. The random variable W has a continuous uniform distribution over the interval $[-6, a]$ where a is a constant.

Given that $\text{Var}(W) = 27$

(a) show that $a = 12$

(2)

Given that $\text{P}(W > b) = \frac{3}{5}$

(b) (i) find the value of b

(2)

(ii) find $\text{P}\left(-12 < W < \frac{b}{2}\right)$

(2)

A piece of wood AB has length 160 cm. The wood is cut at random into 2 pieces. Each of the pieces is then cut in half. The four pieces are used to form the sides of a rectangle.

(c) Calculate the probability that the area of the rectangle is greater than $975\,\text{cm}^2$

(4)

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(Total for Question 5 is 10 marks)

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