2. A continuous random variable Y has the probability density function given at the right.

 $f(y) = \begin{cases} k(1-y^3) & ; & 0 < y \le 1 \\ 0 & ; & \text{otherwise} \end{cases}$ 

**MARKS** 

(a) Evaluate the constant k and sketch the p.d.f. of Y.

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(b) Find the mean of Y.

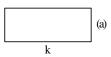
(3, 1, 2, 2)

(c) Find the standard deviation of Y.

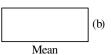
(d) Find an expression for the value of c so that  $Pr(-c \le Y \le c) = 0.8$ .

**BONUS**: Find the value of c in (d) correct to 3 decimal places.

(a)



(b)



(c)

(c)

Standard deviation

(d)



BONUS (2 marks)