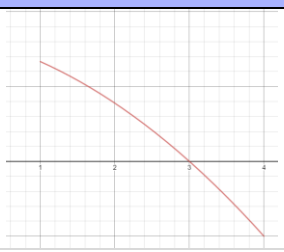
Question Number	Scheme	Marks
4(a)		B1B1
	This is not a valid probability density function since f(x) < 0 for x > 3	B1
		(3)
(b)	$[g(y)=k(12y-y^3)]\Rightarrow[g'(y)]=k(12-3y^2)$	M1
	$12-3y^2=0$ so $y=2$	dM1A1
		(3)
(c)	$\int k(12y-y^3)\mathrm{d}y=k\left[6y^2-\frac{y^4}{4}\right]_1^3$	M1
	$k\left(6\times3^2-\frac{3^4}{4}-6+\frac{1}{4}\right)=1$ so $k=\frac{1}{28}$	dM1A1
		(3)
(d)	$\int_1^m "\frac{1}{28}"(12y-y^3)\mathrm{d}y="\frac{1}{28}"\left(6\times m^2-\frac{m^4}{4}-\left(6\times1^2-\frac{1^4}{4}\right)\right)=0.5$ or $\int "\frac{1}{28}"(12y-y^3)\mathrm{d}y="\frac{1}{28}"\left(6y^2-\frac{y^4}{4}\right)+c$ and use of F(3) = 1 or F(1) = 0 to find c	M1
	$m^4-24m^2+79=0$ oe so $m=1.98437...$ awrt 1.98	M1A1
		(3)
(e)	Median ≈ Mode, therefore there is no skew	M1A1ft
		(2)
	Notes	**Total 14**
(a)	**B1** For correct shape between 1 and 3. Ignore any parts of the graph that extend before x = 1 and or after x =4 Allow even if 3 is not marked on the x axis as long it crosses the x- axis between 1 and 4	
	B1 For a correct shape between 1 and 4 with 1, 3 and 4 labelled on the x-axis	
	B1 For not a density function/Albert is incorrect with supporting reason e.g. probabilities cannot be less than 0	
(b)	**M1** For expanding and attempting to differentiate (or using product rule to differentiate)	
	dM1 Dep on previous M1 For equating to 0 and attempt to solve	
	A1 Cao **NB** Answer only scores 0/3 Do not ISW	
(c)	**M1** For an attempt to integrate g(y) $\left(y^n\rightarrow y^{n+1}\right)$	
	dM1 Dep on previous M1 For equating to 1 and use of correct limits (May be implied by $\frac{135}{4}-\frac{23}{4}$)	
	A1 Oe **NB** Answer only scores 0/3	

(d)	**M1**	For writing or using $\int_1^m g(y)\mathrm{d}y = 0.5$ ft k from part c Allow any letter for m Must see limits/correct use of limits or $\int g(y)\mathrm{d}y$ and use of F(3) = 1 or F(1) =0 to find c
	M1	For $m^4 - 24m^2 + 79 = 0$ oe e.g. $\frac{3}{14}y^2 - \frac{1}{112}y^4 - \frac{23}{112} = 0.5$
	A1	Awrt 1.98 only Must reject other root(s) if seen
(e)	**M1**	For a comparison of their part (b) with their part (d) Allow comparison of the mean (1.9857..) provided the mean is calculated
	A1 ft	For no skew/zero skew oe Condone symmetrical/symmetric (allow [slight] negative [skew]) ft their part (b) and part (d) or the mean provided the mean is calculated Do not allow equal/even skew or normal/normally distributed