5(a)	$\frac{1}{16}\left[\frac{2}{3}x^{\frac{3}{2}}\right]_0^4 + \frac{1}{k}\left[2\sqrt{x}\right]_4^9 = 1$ $\frac{1}{24}(8-0) + \frac{2}{k}(3-2) = 1$ OR $\frac{1}{3} + \frac{2}{k} = 1$
	$\frac{2}{k} = \frac{2}{3},\ k = 3$
5(b)	$\frac{1}{16}\int_0^4 \sqrt{x}\ \mathrm{d}x + \frac{1}{3}\int_4^m x^{-\frac{1}{2}}\ \mathrm{d}x = \frac{1}{2}$ OR $\frac{1}{3}\int_m^9 x^{-\frac{1}{2}}\ \mathrm{d}x = 0.5$
	$\frac{1}{3} + \frac{2}{3}\left(\sqrt{m} - 2\right) = \frac{1}{2}$ OR $\frac{2}{3}\left(3 - \sqrt{m}\right) = \frac{1}{2}$
	$m = \frac{81}{16}$ $[= 5.0625]$

5(c)	$\mathrm{F}(x)=\begin{cases}\frac{1}{24}x^{\frac{3}{2}} & 0\leqslant x<4\\ \frac{2}{3}x^{\frac{1}{2}}-1 & 4\leqslant x\leqslant 9\end{cases}$
	$\mathrm{G}(y)=\begin{cases}\frac{1}{24}y^{3} & 0\leqslant y<2\\ \frac{2}{3}y-1 & 2\leqslant y\leqslant 3\end{cases}$
	$\mathrm{g}(y)=\begin{cases}\frac{1}{8}y^{2} & 0\leqslant y<2\\ \frac{2}{3} & 2\leqslant y\leqslant 3\\ 0 & \text{otherwise}\end{cases}$
	Alternative method for question 5(c)
	Using chain rule (or inverse function): $\mathrm{G}(y)=\mathrm{F}(y^2)$ so $\mathrm{g}(y)=\frac{\mathrm{d}}{\mathrm{d}y}\mathrm{F}(y^2)=2y\mathrm{f}(y^2)$.
	$\mathrm{g}(y)=\begin{cases}2y\left(\frac{1}{16}\sqrt{y^2}\right) & 0\leqslant y<2\\ 2y\left(\dfrac{1}{3\sqrt{y^2}}\right) & 2\leqslant y\leqslant 3\end{cases}$
	$\mathrm{g}(y)=\begin{cases}\frac{1}{8}y^{2} & 0\leqslant y<2\\ \frac{2}{3} & 2\leqslant y\leqslant 3\\ 0 & \text{otherwise}\end{cases}$