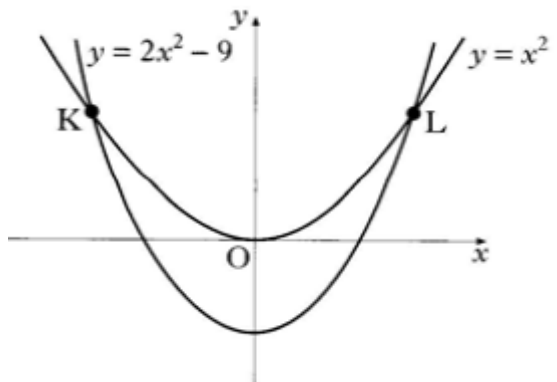
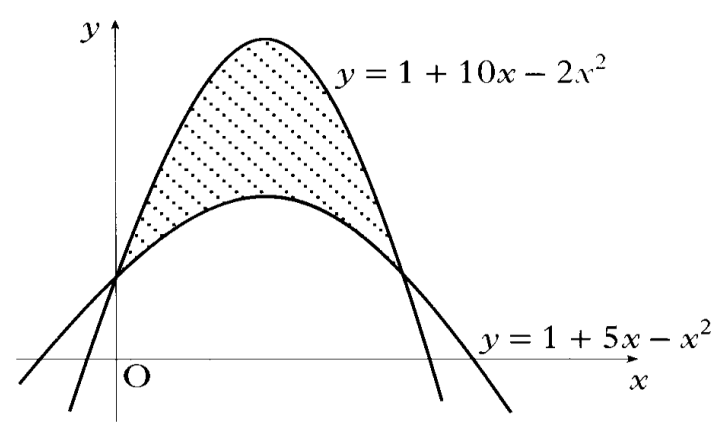


Integration - Definite integrals and area between curves		
1.	Evaluate $\int_1^4 \sqrt{x} \, dx$	4
2.	Evaluate $\int_1^2 \frac{u^2+2}{2u^2} \, du$	5
3.	Find the value of $\int_0^2 \sin(2x + 1) \, dx$	4
4.	<p>The curves with equations $y = x^2$ and $y = 2x^2 - 9$ intersect at K and L as shown. Calculate the coordinates of K and L and hence calculate the area between the curves</p>  <p>The diagram shows a Cartesian coordinate system with x and y axes. Two parabolas are plotted. The first parabola, $y = x^2$, opens upwards with its vertex at the origin O. The second parabola, $y = 2x^2 - 9$, also opens upwards but is shifted downwards and has a vertex at $(0, -9)$. The two parabolas intersect at two points, K and L, which are symmetric about the y-axis. Point K is on the left and point L is on the right.</p>	8
5.	<p>Calculate the shaded area enclosed between the parabolas with equations $y = 1 + 10x - 2x^2$ and $y = 1 + 5x - x^2$</p>  <p>The diagram shows a Cartesian coordinate system with x and y axes. Two parabolas are plotted. The first parabola, $y = 1 + 10x - 2x^2$, has a higher peak and is wider. The second parabola, $y = 1 + 5x - x^2$, has a lower peak and is narrower. The two parabolas intersect at two points. The region between the two curves from the left intersection point to the right intersection point is shaded with diagonal lines.</p>	6

Integration - Answers		
1	Write in index form Integrate Substitute limits Evaluate area	$\int_1^4 x^{1/2} dx$ $\left[\frac{2}{3} x^{3/2} \right]_1^4$ $\left(\frac{2}{3} (4)^{3/2} \right) - \left(\frac{2}{3} (1)^{3/2} \right)$ $\frac{14}{3}$
2	First term in index form Second term in index form Integrate Substitute limits Evaluate area	$\int_1^2 \frac{1}{2} + \dots du$ $\int_1^2 \dots + u^{-2} du$ $\left[\frac{1}{2} u - u^{-1} \right]_1^2$ $\left(\frac{1}{2} (2) - \frac{1}{2} \right) - \left(\frac{1}{2} (1) - 1 \right)$ 1
3	Integrate trig function Differentiate 2x Substitute limits Evaluate area	$-\cos(2x+1)$ $\left[-\frac{1}{2} \cos(2x + 1) \right]_0^2$ $\left(-\frac{1}{2} \cos(2(2) + 1) \right) - \left(-\frac{1}{2} \cos(2(0) + 1) \right)$ 0.13
4	Find the points of intersection between the curves Know to integrate between limits Use "upper – lower" Integrate Substitute limits Evaluate area	$x^2 = 2x^2 - 9$ $9 - x^2 = 0, (3 + x)(3 - x) = 0$ $K (-3, 9) \text{ and } L (3, 9)$ $\int_{-3}^3 \dots dx$ $\int_{-3}^3 (9 - x^2) dx$ $\left[9x - \frac{1}{3} x^3 \right]_{-3}^3$ $\left(9(3) - \frac{1}{3} 3^3 \right) - \left(9(-3) - \frac{1}{3} (-3^3) \right)$ 36
5	Find the points of intersection between the curves Know to integrate between limits Use "upper – lower" Integrate Substitute limits Evaluate area	$1 + 10x - 2x^2 = 1 + 5x - x^2$ $5x - x^2 = 0 \quad x(5 - x) = 0$ $x = 0 \text{ and } x = 5$ $\int_0^5 \dots dx$ $\int_0^5 (5x - x^2) dx$ $\left[\frac{5}{2} x^2 - \frac{1}{3} x^3 \right]_0^5$ $\left(\frac{5}{2} 5^2 - \frac{1}{3} 5^3 \right) - \left(\frac{5}{2} 0^2 - \frac{1}{3} 0^3 \right)$ $\frac{125}{6}$