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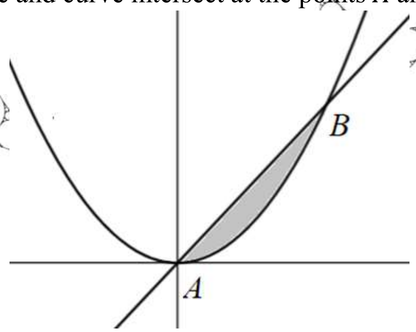
**A LEVEL MATHS**

# (79) Integration (Areas between Curves and Lines)

## WORKING AT D/E

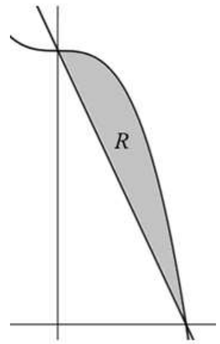
(1) The diagram below shows part of the curve with equation $y = x^2$ and the line with equation $y = 2x$. The line and curve intersect at the points $A$ and $B$.




(a) Use simultaneous equations to find the coordinates of $A$ and $B$.
The shaded area on the diagram is the region trapped between the line and the curve between the points $A$ and $B$.
(b) Show, using calculus and using the area of a triangle, that the area of the shaded region is $\frac{4}{3}$

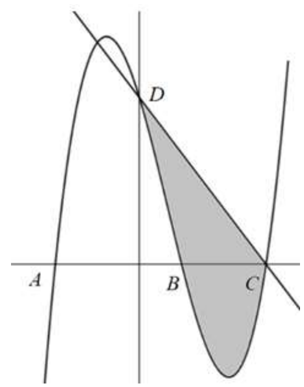
## WORKING AT B/C

(1) The diagram below shows part of the curve with equation $y = -x^3 + 8$ and part of the line with equation $y = 8 - 4x$.




The region $R$ is the area trapped between the curve and the line between where they intersect.
Use calculus to find the area of the shaded region $R$

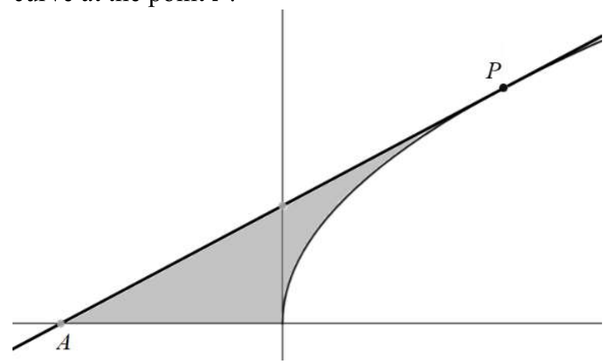
(2) The diagram below shows part of the curve with equation $y = (x-3)(x+2)(x-1)$ and the line with equation $y = 6 - 2x$. The line and curve intersect at the points $C$ and $D$. The curve crosses the $x$ axis at the points $A, B$ and $C$.




Use calculus to show the shaded area is $\frac{45}{4}$

## WORKING AT A*/A

(1) The diagram below shows part of the curve with equation $y = 4\sqrt{x},\ x \geq 0$ and the tangent to the curve at the point $P$.




The equation of the tangent is $y = x + a$ where $a$ is a constant.
(a) Find the coordinates of $P$.
The tangent crosses the $x$ axis at the point $A$.
(b) Find the coordinates of $A$
(c) Use calculus to show that the area of the shaded region shown above is $\frac{32}{3}$ square units.