

Calculus Calculator C Grade

[SQA] 1. Find $\int \frac{(x^2 - 2)(x^2 + 2)}{x^2} dx, x \neq 0$.

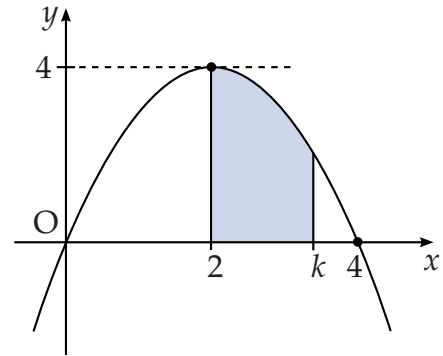
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- [SQA] 2. The parabola shown crosses the x -axis at $(0,0)$ and $(4,0)$, and has a maximum at $(2,4)$.

The shaded area is bounded by the parabola, the x -axis and the lines $x = 2$ and $x = k$.

- (a) Find the equation of the parabola.
 (b) Hence show that the shaded area, A , is given by

$$A = -\frac{1}{3}k^3 + 2k^2 - \frac{16}{3}.$$



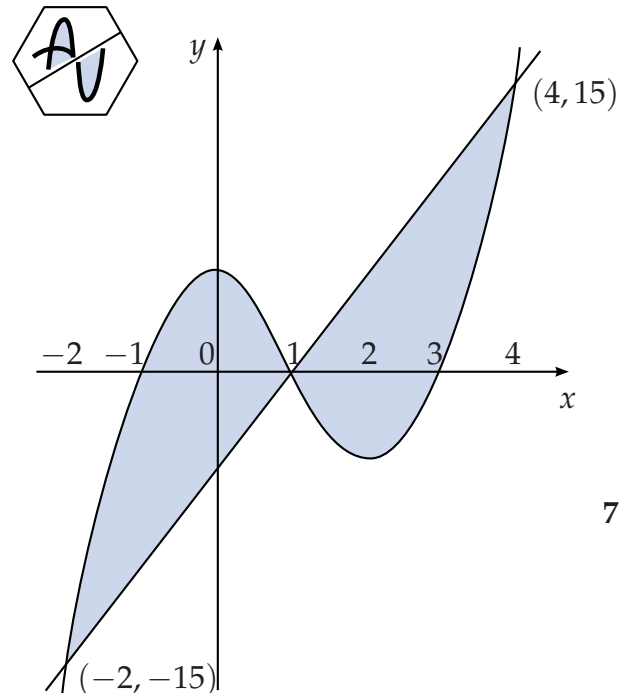
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- [SQA] 3. A firm asked for a logo to be designed involving the letters A and U. Their initial sketch is shown in the hexagon.

A mathematical representation of the final logo is shown in the coordinate diagram.

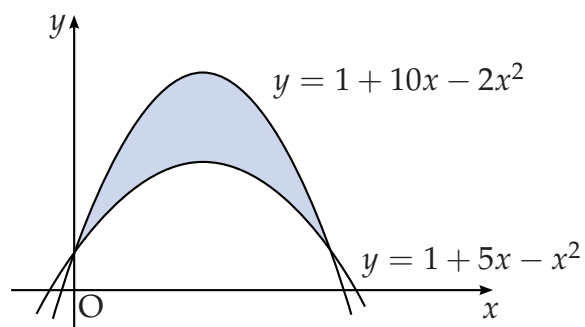
The curve has equation $y = (x + 1)(x - 1)(x - 3)$ and the straight line has equation $y = 5x - 5$. The point $(1,0)$ is the centre of half-turn symmetry.

Calculate the total shaded area.



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- [SQA] 4. Calculate the shaded area enclosed between the parabolas with equations $y = 1 + 10x - 2x^2$ and $y = 1 + 5x - x^2$.



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- [SQA] 5. Find the equation of the tangent to the curve $y = 2 \sin(x - \frac{\pi}{6})$ at the point where $x = \frac{\pi}{3}$.

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- [SQA] 6. Given that $f(x) = (5x - 4)^{\frac{1}{2}}$, evaluate $f'(4)$.

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[END OF QUESTIONS]