Find the area under the curve for the function $f(x) = 4x^3 + 3x^2 - x + 1$ on the interval [1,2].

Solution:

The area between the graph of $y = f(x)$ and the x-axis is given by the definite integral $Area = \int_a^b f(x)dx$. In our case $f(x) = 4x^3 + 3x^2 - x + 1$ and $a = 1, b = 2$.

So, the area is:

$$A = \int_1^2 (4x^3 + 3x^2 - x + 1)\, dx = \left(x^4 + x^3 - \frac{1}{2}x^2 + x\right)\Big|_1^2 =$$

$$= 16 + 8 - 2 + 2 - 1 - 1 + \frac{1}{2} - 1 = \frac{43}{2}$$

Answer: $\frac{43}{2}$.