Antiderivatives

While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

1. Find an antiderivative for each of the following:

   $2x + 1$ $\qquad$ $x^2 - e^x$ $\qquad$ $\sin(x)$

2. Find the most general antiderivative for each of the following:

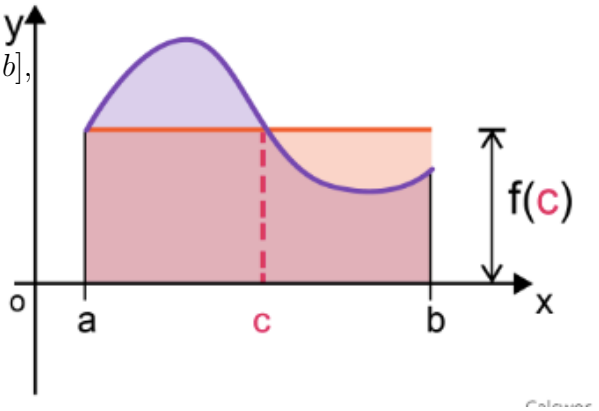
   $\dfrac{-1}{x^2}$ $\qquad$ $\dfrac{1}{x}$ $\qquad$ $\dfrac{2x^5 - \sqrt{x}}{x}$

3. Evaluate:

   $\displaystyle\int_0^1 x^2\,dx$ $\qquad$ $\displaystyle\int_2^6 \frac{1}{u}\,du$ $\qquad$ $\displaystyle\int_{-1}^3 \frac{1}{x^2}\,dx$

Mean Value Theorem (Integral Version!): If f is continuous on the closed interval $[a, b]$, then there exists a number c in the closed interval $[a, b]$ such that

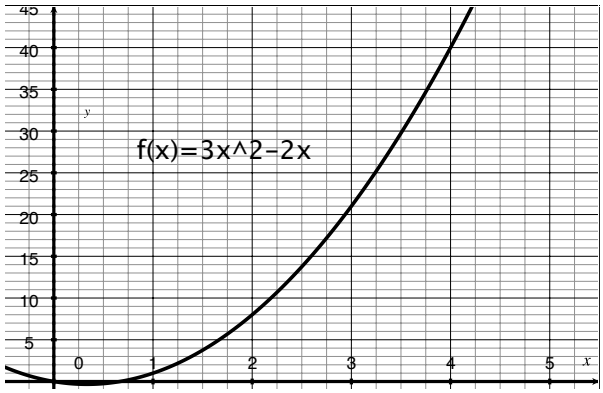
$$\int_a^b f(x)\,dx = f(c)(b-a)$$



Average Value of a Function on an Interval: If f is integrable on the closed interval $[a, b]$, then the *average value* of f on the interval is

$$\frac{1}{b-a}\int_a^b f(x)\,dx$$

4. Find the average value of the function: $f(x) = 3x^2 - 2x$



You can check your answer above by looking at example 4 on page 317.