WORKSHEET

1. An antiderivative of \( \sin x + \cos x \) is
   a) \( \cos x - \sin x \)  b) \( \sin x - \cos x \)  c) \( \sin x + \cos x \)  d) None of them

2. Given \( \int e^x \cdot x \, dx = e^x(x-1) \) [for getting the constant]
   find \( \int e^x \cdot x^2 \, dx \).

   Challenge: can you think of a formula for \( \int e^x \cdot x^n \, dx \)

3. \( \int_0^3 f(x) \, dx = 0 \)  • Which of the following CANNOT happen?
   [mark all options which seem right to you]
   a) \( f \) is increasing function on \([2,3]\)
   b) \( f \) is decreasing function on \([2,3]\)
   c) absolute min value of \( f \) on \([2,3]\) is \(0.002\)
   d) None of these

4. \( \int_2^3 \ln(e^x) \, dx \)

   a) \( \frac{5}{2} \)  b) \( 2e^3 - e^2 \)  c) \( 1 \)  d) None of these

5. \( \int_0^\infty \sin x \, dx \)

   a) Does not exist  b) 0  c) 1  d) None of these
6. Find 
   \( a \int (\sin x + x \cos x) \, dx \)

   \( b \int \left( \frac{\tan x}{x} + x \sec^2 x \right) \, dx \)

   \( c \int (e^x + xe^x) \, dx \)

   Can you see a pattern?

   HINT: \( \int f \, dx = (f')\frac{x}{2} - \int x f' \)

7. Find 
   \( a \int e^x (\sin x + \cos x) \, dx \)

   \( b \int e^x (\tan x + \sec^2 x) \, dx \)

   \( c \int e^x (x + 1) \, dx \)

   Can you see a pattern.

   HINT: what is \( \int e^x f \, dx \)?

8. \[ f \]

   \[ g(x) = 5 \text{ sq. units.} \]

   \[ \int_0^6 g(x) \, dx = 3 \]

   Find \( \int_0^6 f(x) \, dx \).