1. Find the following antiderivatives:
   (a) \( \int e^x \sin(2x) \, dx \)
   (b) \( \int \cos^{-1}(2x) \, dx \)
   (c) \( \int x \ln 2x \, dx \)

2. Determine each of the following integrals:
   (a) \( \int \sin^3 x \cos^2 x \, dx \)
   (b) \( \int \sin 3x \cos 2x \, dx \)
   (c) \( \int \sec^3 x \tan x \, dx \)
   (d) \( \int \sin^2 2x \cos x \, dx \)

3. Use a trigonometric substitution to determine each of the following antiderivatives. In the case that the substitution produces a trigonometric integral, you do not need to reduce further.
   (a) \( \int \frac{dx}{(1 - x^2)^{3/2}} \)
   (b) \( \int \frac{3x^3}{\sqrt{25 - x^2}} \, dx \)
   (c) \( \int \frac{1}{\sqrt{x^2 + 2x + 2}} \, dx \)

4. Determine each antiderivative:
   (a) \( \int \frac{2x + 1}{x^2 - 2x - 2} \, dx \)
   (b) \( \int \frac{2x + 1}{x^2 - 2x + 2} \, dx \)
   (c) \( \int \frac{x^2}{(x - 2)^3} \, dx \)