INSTRUCTIONS: Solve the following antiderivative problems. Use any method we have learned so far. Show all your work.

1. (a) \( \int \sin^3(x) \cos^3(x) \, dx \)
   (b) \( \int -\sin^5(x) \cos^8(x) \, dx \)
   (c) \( \int \sin^2(2x) \cos^2(2x) \, dx \)
   (d) \( \int 3\cos^4(x) \, dx \)
   (e) \( \int 4\sin^2(3x) \, dx \)
   (f) \( \int \sin(x) \cos^{13}(x) \, dx \)
   (g) \( \int \sin^{7/2}(x) \cos(x) \, dx \)
   (h) \( \int \sin(x)\sqrt{\cos(x)} \, dx \)
   (i) \( \int \sin^2(x) \cos^3(x) \, dx \)
   (j) \( \int -\cos^5(x) \, dx \)

2. Use the double angle formulas from class to show that \( \cos^2(x) - \sin^2(x) = \cos(2x) \).
   (Hint: Plug in the formulas on the left and simplify to get the right side)