Before attempting to solve each of these problems, go through and figure out which techniques you’ll need to use to solve each problem.

1. \[ \int_{4}^{\infty} \frac{2x+1}{(x^2 + x - 1)^2} \, dx, \]
2. \[ \int e^{x} \sin x \, dx, \]
3. \[ \int \frac{1}{\sqrt{4x-x^2}} \, dx \]
4. \[ \int (x + 2)^2 \sqrt{x+4} \, dx. \]
5. \[ \int_{4}^{\infty} \frac{\sin x + \sqrt{x}}{x^4} \, dx \]
6. \[ \int_{0}^{1} \frac{1}{\sqrt{x+\ln(x+1)}} \, dx \]
7. \[ \int \sin^2 x - \cos^2 x \, dx \]
8. Find a reduction formula for \( I_n = \int x^2 (\ln x)^n \). Use it to find \( I_3 \).
9. \[ \int \sqrt{x^2 + 4x - 5} \, dx. \]
10. \[ \int \cos^3 x \, dx. \]
11. \[ \int \frac{\ln x}{x} \, dx. \]
12. \[ \int_{1}^{\infty} \frac{x}{x^2 + 1} \, dx. \]
13. \[ \int \frac{x-1}{x^2 + x^2} \, dx. \]
14. \[ \int_{0}^{\infty} \frac{47 + \sin(x^2)}{1 + x^3} \, dx. \]
15. \[ \int \sin^3 (x) \cos^4 (x) \, dx. \]
16. Find a reduction formula for \( I_n = \int (\ln x)^n \, dx \) and compute \( I_0, I_1, I_2, \) and \( I_3. \)
17. \[ \int_{0}^{2\pi} \sin^2(4x) \, dx. \]
18. \[ \int \frac{1}{49 - x^2} \, dx. \]
Test Taking Tips:

- Be neat! Messy work is more error prone. Messy work makes the grader angry. An angry grader will give you a lower score.

- If you are working through a problem and things are getting very very messy, it’s worth going back to check that you didn’t make an error early on.

- There’s absolutely no reason to do the problems in order. Start with the easiest problems. If you get stuck on a problem, move on and return to it later.

- Don’t cheat. If you do, you will die.