

## Math114: Exam 2 Prep

1. Study the various ways to compute trig integrals – integrals with powers of sine, cosine, secant, tangent, etc. Practice them!
2. Study polynomial long division and the various ways to do partial fraction decomposition.
3. You probably/should already know the area of a rectangle, but you may be less familiar with trapezoids...don't forget about them!
4. Compute  $\int_1^{\infty} \frac{1-2x}{x^3} dx$  or state that it diverges.
5. Compute  $\int_0^{\infty} x e^{-x} dx$  or state that it diverges.
6. Compute  $\int_1^{11} \frac{dx}{(x-3)^{2/3}}$  or state that it diverges.
7. Compute  $\int_0^{\pi/6} \tan^4(x) dx$ .
8. Compute  $\int \sin^{-3/2}(x) \cos^3(x) dx$ .
9. Compute  $\int \frac{dx}{\sqrt{4-x^2}}$ .
10. Compute  $\int \frac{dx}{\sqrt{9x^2-25}}$ .
11. Approximate  $\int_0^1 \sin(\pi x) dx$  using 3 rectangles. How large could the error be?
12. Approximate  $\int_0^1 \frac{1}{\pi^2} \sin(\pi x) dx$  using 6 trapezoids. How many trapezoids are needed to guarantee accuracy within  $10^{-4}$ ? Do this WITHOUT a calculator. Use  $\sqrt{3} \approx 1.7$ .
13. Compute  $\int \frac{2x^3 + x^2 - 6x + 7}{x^2 + x - 6} dx$ .
14. Compute  $\int \frac{x^2 - 1}{x^3(x^2 + 1)} dx$ .