

This is the collection of integrals from my last few exams.

1. $\int \sin^3(x) dx$

2. $\int \sin^{-1}(x) dx$

3. $\int (x^2 + 1) \cos(3x) dx$

4. $\int \ln(x^2 + 1) dx$

Hint: Use parts.

5. $\int (\tan x + \sec x)^2 dx$

6. $\int \frac{x+1}{\sqrt{3x-2}} dx$

7. $\int \frac{dx}{x^2 - 4x + 3}$

8. $\int \frac{2x-3}{\sqrt{9-4x^2}} dx$

9. $\int \frac{dx}{x^3 \sqrt{x^2-1}} \quad (x > 1)$

10. $\int_0^{\frac{\pi}{6}} \sqrt{1 + \cos(3x)} dx$

Hint: Use a double angle formula.

11. Compute the following antiderivatives.

(a) $\int_0^1 x \tan^{-1} x dx$

(b) $\int \tan^3 x \sec^4 x dx$

12. (20 points — 5 points each, NO PARTIAL CREDIT) Find the following antiderivatives. No work need be shown if you have them memorized.

(a) $\int \tan x dx$

(b) $\int \sec x dx$

(c) $\int \sin^2 x dx$

(d) $\int \ln x dx$

13. (10 points) Compute $\int \frac{(25 - 9x^2)^{1/2}}{x^4} dx$

14. (10 points) Compute $\int_0^{\sqrt{3}} \frac{2x-5}{(x^2+3)^2} dx$

15. (10 points) Compute the following antiderivatives.

(a) $\int \sin^3(4x) \cos^8(4x) dx$

(b) $\int (\tan x)^{2/3} \sec^4 x \, dx$

16. (10 points) Find $\int \ln x \, dx$.

17. (10 points) Compute $\int_1^3 x e^{-5x} \, dx$

18. (20 points) Compute $\int \frac{\sqrt{u^2 - 16}}{u^3} du \quad (u > 4)$

19. (20 points) Compute $\int_0^{\sqrt{5}} \frac{3x - 4}{(x^2 + 5)^2} dx$