

Evaluate each of the following integrals. For each integral, write down the integration technique you ended up using, and why you chose it. There are hints for a few of these on the next page. Remember that you can always check your answer by differentiating it!

1. $\int \frac{\ln(t^2)}{t} dt$

13. $\int (\ln x)^2 dx$

2. $\int xe^{2x} dx$

14. $\int \frac{x}{x+1} dx$

3. $\int \cos^3 x \sin x dx$

15. $\int \frac{x^2}{1+x} dx$

4. $\int_0^\pi x \sin(2x) dx$

16. $\int \tan^2 p \sec^2 p dp$

5. $\int \cos^2 x \sin^3 x dx$

17. $\int_2^{10} \frac{1}{\sqrt{5x-1}} dx$

6. $\int_3^4 \frac{1}{2y+1} dy$

18. $\int_0^1 \arcsin t dt$

7. $\int_1^2 \frac{e^{\frac{1}{x}}}{x^2} dx$

19. $\int \frac{1}{\sqrt{x}(1+\sqrt{x})} dx$

8. $\int \frac{1}{\sqrt{1-x^2}} dx$

20. $\int \frac{1}{1+9r^2} dr$

9. $\int \frac{1}{x^2+1} dx$

21. $\int \cos^2 x dx$

10. $\int_1^4 \frac{\cos(\sqrt{x})}{\sqrt{x}} dx$

22. $\int \frac{\sec^2 x}{\sqrt{\tan x}} dx$

11. $\int \tan^2 x dx$

23. $\int \cot x dx = \int \frac{\cos x}{\sin x} dx$

12. $\int_0^1 e^{-2x} dx$

24. $\int \frac{2x}{\sqrt[4]{1-x^4}} dx$

Hints

1. Algebra first!
5. $\sin^3 x = \sin^2 x \cdot \sin x$, and $\sin^2 x + \cos^2 x = 1$.
8. and 9. These are easy!
11. Look up a trig identity involving $\tan^2 x$ in the trig worksheets!
16. What is the derivative of $\tan x$?
20. Compare to Q9.
21. $\cos 2x = \cos^2 x - \sin^2 x = \cos^2 x - (1 - \cos^2 x) = 2\cos^2 x - 1$
24. Compare to Q8.