

SUBJECT: MATHEMATICS
CHAPTER: Indefinite Integrals

1. $\int \frac{1}{e^x - 1} dx =$
 - a. $\log(e^x - 1) - x + c$
 - b. $\log(1 - e^x) + c$
 - c. $\log(1 - e^x) + x + c$
 - d. None

2. $\int (\tan x + \cot x) dx =$
 - a. $\log \tan x + c$
 - b. $\log(\sin x + \cos x) + c$
 - c. $\log x + c$
 - d. None

3. $\int \sin(\log x) + \cos(\log x) dx =$
 - a. $x \sin(\log x) + c$
 - b. $x \cos(\log x) + c$
 - c. $\sin(\log x) - \cos(\log x) + c$
 - d. None

4. $\int e^{-\log x} dx =$
 - a. $-e^{-\log x} + c$
 - b. $-xe^{-\log x} + c$
 - c. $\log x + c$
 - d. $xe^{-\log x} + c$

5. $\int \left(\frac{\tan^{-1} x}{x} \right)^2 dx =$
 - a. $x - \tan x + c$
 - b. $1/x - \tan(1/x) + c$
 - c. $1/x + \tan(1/x) + c$
 - d. None

6. $\int \frac{\tan \sqrt{x}}{\sqrt{x}} dx =$

- a. $\log(\cos \sqrt{x}) + c$
- b. $\log(\sec \sqrt{x}) + c$
- c. $2 \log(\sec \sqrt{x}) + c$
- d. None

7. $\int \frac{4x^3}{x^8+1} dx$

- a. $\log(x^8 + 1) + c$
- b. $4 \tan^{-1}(x^4 + 1) + c$
- c. $4 \tan^{-1}\left(\frac{1}{4}x^4\right) + c$
- d. $\tan^{-1} x^4 + c$

8. If $\int \frac{2^x}{\sqrt{1-4^x}} dx = k \cdot \sin^{-1}(2^x)$, then $k =$

- a. $\log 2$
- b. $\frac{1}{2} \log 2$
- c. $(\log 2)^{-1}$
- d. $1/2$

9. $\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx =$

- a. $\frac{-1}{\sin x + \cos x} + c$
- b. $\log(\sin x + \cos x) + c$
- c. $\log(\sin x - \cos x) + c$
- d. $\log(\sin x + \cos x)^2 + c$

10. $\int \frac{1}{\sqrt{3-4x}} dx =$

- a. $\frac{1}{2\sqrt{3-4x}} + c$
- b. $2\sqrt{3-4x} + c$
- c. $\frac{1}{\sqrt{3-4x}} + c$
- d. $-\frac{1}{2\sqrt{3-4x}} + c$

11. $\int \frac{(4x+3)}{(3x+7)} dx =$

- a. $\frac{4}{3}x$
- b. $\frac{19}{9}\log(3x+7) + c$
- c. $\frac{4x}{3} - \frac{19}{9}\log(3x+7) + c$
- d. $\frac{4x}{3} - \log(3x+7) + c$

12. $\int x2^x dx$

- a. $\frac{2^x}{\log 2}(x + \log x) + c$
- b. $\frac{2^x}{\log 2}\left(\log \frac{e^x}{2}\right) + c$
- c. $\frac{2^x}{(\log 2)^2}(x \cdot \log 2 - 1) + c$
- d. *none*

13. $\int \frac{x^5}{x^2+1} dx =$

- a. $\frac{x^4}{4} + \frac{x^2}{2} + \tan^{-1} x + c$
- b. $\frac{x^4}{4} - \frac{x^2}{2} + \frac{1}{2}\log(x^2 + 1) + c$
- c. $\frac{x^4}{4} + \frac{x^2}{2} - \tan^{-1} x + c$
- d. $\frac{x^4}{4} - \frac{x^2}{2} - \tan^{-1} x + c$

14. $\int ((x+1)^2) e^x dx$

- a. $xe^x + c$
- b. $x^2e^x + c$
- c. $(x+1)e^x + c$
- d. $(x^2+1)e^x + c$

$$15. \int \frac{dx}{7+5 \cos x} =$$

- $\frac{1}{\sqrt{3}} \tan^{-1} \left(\frac{1}{\sqrt{3}} \tan \frac{x}{2} \right) + c$
- $\frac{1}{\sqrt{6}} \tan^{-1} \left(\frac{1}{\sqrt{6}} \tan \frac{x}{2} \right) + c$
- $\frac{1}{7} \tan^{-1} \left(\tan \frac{x}{2} \right) + c$
- $\frac{1}{4} \tan^{-1} \left(\tan \frac{x}{2} \right) + c$

$$16. \int (\sin^4 x - \cos^4 x) dx =$$

- $\frac{\cos 2x}{2} + c$
- $\frac{-\sin 2x}{2} + c$
- $\frac{\sin 2x}{2} + c$
- $\frac{-\cos 2x}{2} + c$

$$17. \int \frac{(a^x + b^x)^2}{a^x b^x} dx =$$

- $\frac{(a/b)^x}{\log_e(a/b)} + \frac{(b/a)^x}{\log_e(b/a)} + 2x + c$
- $\frac{(a/b)^x}{\log_e(a/b)} - \frac{(b/a)^x}{\log_e(b/a)} + 2x + c$
- $(a/b)^x \log(a/b) + (b/a)^x \log(b/a) + 2x + c$
- $(a/b)^x \log(a/b) - (b/a)^x \log(b/a) - 2x + c$

$$18. \int \frac{\operatorname{cosec}^2 x}{4+9 \cot^2 x} dx =$$

- $-\frac{1}{3} \tan^{-1} \left(\frac{3 \cot x}{2} \right) + c$
- $-\frac{1}{6} \tan^{-1} \left(\frac{3 \cot x}{4} \right) + c$
- $-\frac{1}{9} \log (4 + 9 \cot^2 x) + c$
- $-\frac{1}{6} \tan^{-1} \left(\frac{3 \cot x}{2} \right) + c$

19. If $\int \frac{dx}{5+4\cos x} = k \cdot \tan^{-1}(M \cdot \tan x/2) + c$ then

- a. $k=1$
- b. $k=2/3$
- c. $M=4/3$
- d. $M=2/3$

20. $\int \operatorname{cosec}^3 x dx =$

- a. $\frac{1}{2}(-\operatorname{cosec} x \cdot \cot x) + \frac{1}{2} \log (\operatorname{cosec} x + \cot x) + c$
- b. $\frac{1}{2}(\operatorname{cosec} x \cdot \cot x) + \frac{1}{2} \log (\operatorname{cosec} x + \cot x) + c$
- c. $\frac{1}{2}(\operatorname{cosec} x \cdot \cot x) - \frac{1}{2} \log (\operatorname{cosec} x + \cot x) + c$
- d. $\frac{1}{2}(-\operatorname{cosec} x \cdot \cot x) - \frac{1}{2} \log (\operatorname{cosec} x + \cot x) + c$

21. $\int \sqrt{\frac{x}{a^3-x^3}} dx = g(x) + c$ where $g(x)=$

- a. $2/3 \cos^{-1} x$
- b. $2/3 \sin^{-1} \left(\frac{x^3}{a^3} \right)$
- c. $2/3 \sin^{-1} \left(\sqrt{\frac{x^3}{a^3}} \right)$
- d. $2/3 \cos^{-1} \left(\frac{x}{a} \right)$

22. $\int (\log x)^x dx$ then $I_n + I_{n-1} =$

- a. $(x \log x)^x$
- b. $x(\log x)^x$
- c. $n(\log x)$
- d. $(\log x)^{x-1}$

23. $\int \frac{\cos 4x+1}{\cot x - \tan x} dx = A \operatorname{cosec} x + B$, then

- a. $A = -1/2$
- b. $A = -1/8$
- c. $A = -1/4$
- d. None

24. $\int \frac{2x^2+3}{(x^2-1)(x^2+3)} dx$ if $I=A\log\frac{x-1}{x+1}+B\tan^{-1}\frac{x}{2}$ then A & B is

- a. -1,1
- b. 1,-1
- c. $\frac{1}{2}, \frac{1}{2}$
- d. $-\frac{1}{2}, \frac{1}{2}$

25. $\int 32x^3 \cdot (\log x)^2 dx =$

- a. $8x^4(\log x)^2 + c$
- b. $x^4[8(\log x)^2 - 4\log x + 1] + c$
- c. $x^4[8(\log x)^2 - 4\log x] + c$
- d. $x^3[(\log x)^2 + 2\log x] + c$