MATHS

BOOKS - CBSE COMPLEMENTARY MATERIAL MATHS (HINGLISH)

INTEGRALS

One Mark Questions

1. Evaluate the following integrals:

$$\int \left(\sin^{-1}\sqrt{x} + \cos^{-1}\sqrt{x}\right) dx$$

A.

B.

C.

D.

Answer: $\frac{\pi}{2}x + c$

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2. Evaluate the following integrals:

$$\int_{-1}^{1} e^{|x|} dx$$

A.

B.

C.

D.

Answer: $2e - 2$

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3. Evaluate the following integrals:

$$\int \frac{dx}{1 - \sin^2 x}$$

A.

B.

C.

D.

Answer: $\tan x + c$

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4. Evaluate the following integrals:

$$\int_{-1}^{1} x^{99} \cos^4 x dx$$

A.

B.

C.

D.

Answer: 0

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5. Evaluate: $\int \frac{1}{x \log x \log(\log x) dx}$

A.

B.

C.

D.

Answer: $\log|\log|\log x|| + c$

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6. Evaluate the following integrals:

$$\int_{-\frac{1}{2}}^{\frac{1}{2}} \cos x \log\left(\frac{1+x}{1-x}\right) dx$$

A.

B.

C.

D.

Answer: 0

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7. $\int \left(e^{x \log a} + e^{a \log x}\right) dx$

A.

B.

C.

D.

Answer: $\frac{x^{a+1}}{a+1} + \frac{a^x}{\log a} + c$

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8. Evaluate the following integrals:

$$\int \frac{\cos 2x + 2\sin^2 x}{\cos^2 x} dx$$

A.

B.

C.

D.

Answer: $\tan x + c$

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9. $\int_{-\pi/2}^{\pi/2} \sin^7 x dx =$

A.

B.

C.

D.

Answer: 0

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10. Evaluate the following integrals:

$$\int \sqrt{10 - 4x + x^2}\, dx$$

A.

B.

C.

D.

Answer: $\frac{(x-2)\sqrt{x^2-4x+10}}{2} + 3\log\left|(x-2) + \sqrt{x^2-4x+10}\right| + c$

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11. Evaluate the following integrals:

$$\int_{-1}^{1} x^3|x|dx$$

A.

B.

C.

D.

Answer: 0

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12. Evaluate the following integrals:

$$\int \frac{1}{\sin^2 x \cos^2 x} dx$$

A.

B.

C.

D.

Answer: $\tan x - \cot x + c$

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13. Evaluate the following integrals:

$$\int_{-2}^{2} \frac{dx}{1 + |x - 1|}$$

A.

B.

C.

D.

Answer: $3 \log_e 2$

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14. Evaluate the following integrals:

$$\int e^{-\log x} dx$$

A.

B.

C.

D.

Answer: $\log|x| + c$

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15. Evaluate the following integrals:

$$\int \frac{e^x}{a^x} dx$$

A.

B.

C.

D.

Answer: $\frac{\left(\frac{e}{a}\right)^x}{\log\left(\frac{e}{a}\right)} + c$

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16. Evaluate the following integrals:

$$\int \frac{x}{\sqrt{x+1}} dx$$

A.

B.

C.

D.

Answer: $\frac{2}{3}(x+1)^{3/2} - 2(x+1)^{1/2} + c$

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17. Evaluate the following integrals:

$$\int \frac{x}{(x+1)^2} dx$$

A.

B.

C.

D.

Answer: $\log|x+1| + \frac{1}{x+1} + c$

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18. $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

A.

B.

C.

D.

Answer: $2e^{\sqrt{x}} + c$

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19. Evaluate the following integrals:

$$\int \cos^2 \alpha dx$$

A.

B.

C.

D.

Answer: $x \cos^2 \alpha + c$

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20. Evaluate the following integrals:

$$\int \frac{1}{x \cos \alpha + 1} dx$$

A.

B.

C.

D.

Answer: $\frac{\log|x\cos\alpha+1|}{\cos\alpha}+c$

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21. $\int\sec x.\log(\sec x+\tan x)dx$

A.

B.

C.

D.

Answer: $\frac{(\log|\sec x+\tan x|)^2}{2}+c$

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22. Evaluate the following integrals:

$$\int \frac{1}{\cos \alpha x \sin \alpha} dx$$

A.

B.

C.

D.

Answer: $\frac{\log|\cos \alpha + x \sin \alpha|}{\sin \alpha} + c$

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23. $\int \frac{\sec^2(\log x)}{x} dx$

A.

B.

C.

D.

Answer: $\tan|\log x| + c$

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24. $\int \frac{e^x}{\sqrt{4+e^{2x}}} dx$

A.

B.

C.

D.

Answer: $\log\left|e^x + \sqrt{4+e^{2x}}\right| + c$

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25. Evaluate the following integrals:

$$\int \frac{1}{x(2+3\log x)}dx$$

A.

B.

C.

D.

Answer: $\frac{1}{3}\log|2+3\log x|+c$

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26. Evaluate the following integrals:

$$\int \frac{1-\sin x}{x+\cos x}dx$$

A.

B.

C.

D.

Answer: $\log|x + \cos x| + c$

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27. Evaluate the following integrals:

$$\int \frac{1 - \cos x}{\sin x} dx$$

A.

B.

C.

D.

Answer: $2 \log \left| \frac{1}{2} \text{sec.} \frac{x}{2} \right| + c$

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28. $\int \frac{x^{e-1}+e^{x-1}}{x^2+e^x}$ dx is equal to

A.

B.

C.

D.

Answer: $\frac{1}{e}\log|x^e+e^x|+c$

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29. Evaluate the following integrals:

$$\int \frac{(x+1)}{x}(x+\log x)dx$$

A.

B.

C.

D.

Answer: $\frac{(x+\log x)^2}{2}+c$

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30. Evaluate the following integrals:

$$\int_0^{\pi} |\cos x| dx$$

A.

B.

C.

D.

Answer: 2

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31. Evaluate the following integrals:

$\int_0^2 [x]dx$ where $[x]$ is greatest integers function.

A.

B.

C.

D.

Answer: 1

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32. Evaluate the following integrals:

$\int \frac{1}{\sqrt{9-4x^2}}dx$

A.

B.

C.

D.

Answer: $\frac{1}{2}\sin^{-1}\left(\frac{2x}{3}\right)+c$

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33. $\int_a^b \frac{f(x)}{f(x)+f(a+b-x)}dx =$

A.

B.

C.

D.

Answer: $\frac{b-a}{2}$

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34. Evaluate each of the following integral: $\int_{-2}^{1} \frac{|x|}{x} dx$

A.

B.

C.

D.

Answer: -1

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35. Evaluate each of the following integral: $\int_{-1}^{1} x|x|dx$

A.

B.

C.

D.

Answer: 0

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36. Evaluate the following integrals:

$$\int x\sqrt{x+2}dx$$

A.

B.

C.

D.

Answer: $\frac{2}{5}(x+2)^{5/2} - \frac{4}{3}(x+2)^{3/2} + c$

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37. Evaluate the following integrals:

$$\int_a^b f(x)dx + \int_b^a f(x)dx$$

A.

B.

C.

D.

Answer: 0

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38. Evaluate the following integrals:

$$\int \frac{\sin x}{\sin 2x} dx$$

A.

B.

C.

D.

Answer: $\frac{1}{2}\log|\sec x + \tan x| + c$

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39. Evaluate the following integrals:

$$\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} |\sin x| dx$$

A.

B.

C.

D.

Answer: $2 - \sqrt{2}$

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40. Evaluate the following integrals:

$$\int \frac{1}{\sec x + \tan x} dx$$

A.

B.

C.

D.

Answer: $\log|1+\sin x|+c$

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41. Evaluate the following integrals : $\int \frac{\sin^2 x}{1+\cos x} dx$

A.

B.

C.

D.

Answer: $x-\sin x+c$

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42. $\int \frac{1-\tan x}{1+\tan x} dx =$

A.

B.

C.

D.

Answer: $\log|\cos x + \sin x| + c$

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Two Mark Questions

1. Evaluate :

$\int e^{[\log(x+1) - \log x]} dx$

A.

B.

C.

D.

Answer: $x + \log x + c$

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2. Evaluate :

$$\int \frac{1}{\sqrt{x+1} + \sqrt{x+2}} dx$$

A.

B.

C.

D.

Answer: $\frac{2}{3}\left[(x+2)^{3/2} - (x+1)^{3/2}\right] + c$

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3. Evaluate :

$$\int \sin x \sin 2x dx$$

A.

B.

C.

D.

Answer: $\frac{-1}{2}\left[\frac{\sin 3x}{3} - \sin x\right] + c$

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4. Evaluate :

$$\int \left[\frac{x}{a} + \frac{a}{x} + x^a + a^x\right] dx$$

A.

B.

C.

D.

Answer: $\frac{1}{a}\frac{x^2}{2} + a\log|x| + \frac{x^{a+1}}{a+1} + \frac{a^x}{\log a} + c$

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5. Evaluate :

$$\int_0^{\pi/2} \log\left(\frac{5+3\cos x}{5+3\sin x}\right)dx$$

A.

B.

C.

D.

Answer: 0

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6. Evaluate :

$$\int \frac{a^x + b^x}{c^x} dx$$

A.

B.

C.

D.

Answer: $\frac{\left(\frac{a}{c}\right)^x}{\log\left|\frac{a}{c}\right|} + \frac{\left(\frac{b}{c}\right)^x}{\log\left|\frac{b}{c}\right|} + c$

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7. Evaluate :

$$\int \left(\sqrt{ax} - \frac{1}{\sqrt{ax}}\right)^2 dx$$

A.

B.

C.

D.

Answer: $\frac{ax^2}{2} + \frac{\log|x|}{a} - 2x + c$

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8. Evaluate the following integration

$\int 2^x \cdot e^x \cdot dx$

A.

B.

C.

D.

Answer: $\frac{2^x e^x}{\log(2e)} + c$

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9. Evaluate: $\int 2^2 \hat{} x 2^2 \hat{} x dx$.

A.

B.

C.

D.

Answer: $\frac{2^{2^{2^x}}}{\left(\log^2\right)^3} + C$

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10. Evaluate :

$$\int \frac{\sin\left(2\tan^{-1} x\right)}{1+x^2} dx$$

A.

B.

C.

D.

Answer: $\frac{-\left[\cos 2\left(\tan^{-1} x\right)\right]}{2} + C$

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11. Evaluate :

$\int x \log 2x dx$

A.

B.

C.

D.

Answer: $\frac{x^2}{2}\log 2x - \frac{x^2}{4} + C$

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12. Evaluate :

$$\int_0^{\pi/2} \sqrt{1+\sin 2x}dx$$

A.

B.

C.

D.

Answer: 1

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13. Evaluate :

$$\int_0^{\pi/2} e^x(\sin x - \cos x)dx$$

A.

B.

C.

D.

Answer: 1

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14. Evaluate :

$$\int_4^9 \frac{\sqrt{x}}{\left(30 - x^{3/2}\right)^2} dx$$

A.

B.

C.

D.

Answer: $\frac{19}{99}$

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15. $\int_0^1 \frac{dx}{e^x + e^{-x}}$

A.

B.

C.

D.

Answer: $\tan^{-1} e - \frac{\pi}{4}$

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16. Evaluate :

$\int \frac{\log|\sin x|}{\tan x} dx$

A.

B.

C.

D.

Answer: $\frac{\log|\sin x|^2}{2} + C$

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17. $\int x^2 \sec x^3 dx$

A.

B.

C.

D.

Answer:

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18. Evaluate :

$$\int \sqrt{\tan x}\left(1+\tan^2 x\right)dx$$

A.

B.

C.

D.

Answer: $\frac{2}{3}(\tan x)^{3/2}+C$

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19. Evaluate :

$$\int \frac{\sin 2x}{(a+b\cos x)^2}dx$$

A.

B.

C.

D.

Answer: $-\frac{2}{b^2}\left[\log|a+b\cos x|+\frac{a}{a+b\cos x}\right]+C$

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20. Evaluate :

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

A.

B.

C.

D.

Answer: $x-\frac{1}{2}\log\left|x^2+1\right|+\tan^{-1}x+C$

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Four Mark Questions

1. Evaluate :

$$\int \frac{x \cos ec\left(\tan^{-1} x^2\right)}{1+x^4} dx$$

A.

B.

C.

D.

Answer: $\frac{1}{2}\log\left[\cos ec\left(\tan^{-1} x^2\right) - \frac{1}{x^2}\right] + c$

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2. Evaluate :

$$\int \frac{\sqrt{x+1} - \sqrt{x-1}}{\sqrt{x+1} + \sqrt{x-1}} dx$$

A.

B.

C.

D.

Answer: $\frac{1}{2}\left(x^2 - x\sqrt{x^2-1}\right) + \frac{1}{2}\log\left|x + \sqrt{x^2-1}\right| + c$

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3. $\int \frac{dx}{\sin(x-a)\sin(x-b)}$

A.

B.

C.

D.

Answer: $\frac{1}{\sin(a-b)}\log\left|\frac{\sin(x-a)}{\sin(x-b)}\right| + c$

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4. Evaluate :

$$\int \frac{\cos(x+a)}{\cos(x-a)} dx$$

A.

B.

C.

D.

Answer: $x \cos 2a - \sin a \log|\sec(x-a)| + c$

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5. $\int \cos 2x . \cos 4x . \cos 6x dx$

A.

B.

C.

D.

Answer: $\frac{3}{8}x - \frac{1}{4}\sin 2x + \frac{1}{32}\sin 4x + c$

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6. Evaluate :

$\int \tan 2x \tan 3x \tan 5x dx$

A.

B.

C.

D.

Answer: $\frac{1}{5}\log|\sec 5x| - \frac{1}{2}\log|\sec 2x| - \frac{1}{3}\log|\sec 3x| + c$

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7. Evaluate :

$$\int \sin^2 x \cos^4 x dx$$

A.

B.

C.

D.

Answer: $\frac{1}{32}\left[2x + \frac{1}{2}\sin 2x - \frac{1}{2}\sin 4x - \frac{1}{6}\sin 6x\right] + c$

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8. Evaluate :

$$\int \cot^3 x \cos ec^4 x dx$$

A.

B.

C.

D.

Answer: $-\left(\frac{\cot^6 x}{6}+\frac{\cot^4 x}{4}\right)+c$

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9. $\int \frac{\sin x \cos x}{\sqrt{a^2 \sin^2 x + b^2 \cos^2 x}} dx$ sin x COSXVa2sin2x+b2cos2x

A.

B.

C.

D.

Answer: $\frac{1}{a^2-b^2}\sqrt{a^2 \sin^2 x + b^2 \cos^2 x}+c$

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10. $\int \frac{1}{\sqrt{\cos^3 x \cos(x+a)}} dx$

A.

B.

C.

D.

Answer: $-2\cos eca\sqrt{\cos a - \tan x \sin a} + c$

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11. $\int \frac{\sin^6 x + \cos^6 x}{\sin^2 x \cos^2 x} dx$

A.

B.

C.

D.

Answer: $\tan x - \cot x - 3x + c$

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12. $\int\left(\frac{\sin x + \cos x}{\sqrt{\sin 2x}}dx\right.$

A.

B.

C.

D.

Answer: $\sin^{-1}[\sin x - \cos x] + c$

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13. Evaluate: $\int\frac{x}{x^4 + x^2 + 1}dx$

A.

B.

C.

D.

Answer: $\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)+c$

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14. Evaluate $\int \frac{dx}{x\left\{6(\log x)^2+7\log x+2\right\}}$.

A.

B.

C.

D.

Answer: $\log\left|\frac{2\log x}{3\log x}\right|+c$

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15. $\int \frac{dx}{\sqrt{\sin^3 x \cos^5 x}} =$

A.

B.

C.

D.

Answer: $\frac{-2}{\sqrt{\tan x}} + \frac{2}{3}\tan^{3/2} x + c$

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16. Evaluate: $\int \frac{x^2+1}{x^4+1} dx$

A.

B.

C.

D.

Answer: $\frac{1}{\sqrt{2}}\tan^{-1}\left\{\frac{1}{\sqrt{2}}\left(x-\frac{1}{x}\right)\right\}+c$

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17. $\int \frac{1}{\sqrt{(x-a)(x-b)}}dx$

A.

B.

C.

D.

Answer: $2\log\left|\sqrt{x-a}+\sqrt{x-b}\right|+c$

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18. Evaluate: $\int \frac{5x-2}{1+2x+3x^2}dx$

A.

B.

C.

D.

Answer: $\frac{5}{6}\log|3x^2+2x+1|+\frac{-11}{3\sqrt{2}}\tan^{-1}\left(\frac{3x+1}{\sqrt{2}}\right)+c$

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19. $\int \frac{x^2}{x^2+6x+12}dx$

A.

B.

C.

D.

Answer: $x - 3\log\left|x^2 + 6x + 12\right| + 2\sqrt{3}\tan^{-1}\left(\frac{x+3}{\sqrt{3}}\right) + c$

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20. Evaluate :

$$\int \frac{x+2}{\sqrt{4x - x^2}} dx$$

A.

B.

C.

D.

Answer: $-\sqrt{4x - x^2} + 4\sin^{-1}\left(\frac{x-2}{2}\right) + c$

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21. Evaluate: $\int x\sqrt{1 + x - x^2}\, dx$

A.

B.

C.

D.

Answer:

$$-\frac{1}{3}\left(1+x-x^2\right)^{3/2}+\frac{1}{8}(2x-1)\sqrt{1+x-x^2}+\frac{5}{16}\sin^{-1}\left(\frac{2x-1}{\sqrt{5}}\right)+$$

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22. $\int\frac{\sin^4 x}{\cos^8 x}dx$

A.

B.

C.

D.

Answer: $\frac{\tan^5 x}{5} + \frac{\tan^7 x}{7} + c$

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23. Evaluate: $\int \sqrt{\sec x - 1}\, dx$

A.

B.

C.

D.

Answer: $-\log\left|\cos x + \frac{1}{2} + \sqrt{\cos^2 x + \cos x}\right| + c$

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24. Evaluate :

$$\int \frac{dx}{x(x^7 + 1)}$$

A.

B.

C.

D.

Answer: $\frac{1}{7}\log\left|\frac{x^7}{x^7+1}\right|+c$

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25. $\int\frac{3x+5}{x^3-x^2-x+1}.\,dx$

A.

B.

C.

D.

Answer: $\frac{1}{2}\log\left|\frac{x+1}{x-1}\right|-\frac{4}{x-1}+c$

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26. $\int \frac{\sin\theta\cos\theta}{\cos^2\theta - \cos\theta - 2} d\theta.$

A.

B.

C.

D.

Answer: $\frac{-2}{3}\log|\cos\theta - 2| - \frac{1}{3}\log|1 + \cos\theta| + c$

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27. Evaluate :

$\int \frac{dx}{(2-x)(x^2+3)}$

A.

B.

C.

D.

Answer: $\frac{1}{14}\log\left|\frac{x^3+3}{(2-x)^2}\right|+\frac{2}{7\sqrt{3}}\tan^{-1}\left(\frac{x}{\sqrt{3}}\right)+c$

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28. Evaluate :

$$\int\frac{x^2+x+2}{(x-2)(x-1)}dx$$

A.

B.

C.

D.

Answer: $x+4\log\left|\frac{(x-2)^2}{x-1}\right|+c$

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29. Evaluate: $\int \frac{(x^2+1)(x^2+2)}{(x^2+3)(x^2+4)}\,dx$

A.

B.

C.

D.

Answer: $x + \frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{x}{\sqrt{3}}\right) - 3\tan^{-1}\left(\frac{x}{2}\right) + c$

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30. Evaluate :

$\int \frac{dx}{(2x+1)(x^2+4)}$

A.

B.

C.

D.

Answer: $\frac{2}{17}\log|2x+1| - \frac{1}{17}\log|x^2+4| + \frac{1}{34}\frac{\tan^{-1}x}{2} + c$

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31. Evaluate :

$$\int \frac{x^2-1}{x^4+x^2+1}dx$$

A.

B.

C.

D.

Answer: $\frac{1}{2}\log\left|\frac{x^2-x+1}{x^2+x+1}\right| + c$

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32. $\int \sqrt{\tan x}\,dx$

A.

B.

C.

D.

Answer:

$$\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{\tan x-1}{\sqrt{2\tan x}}\right)+\frac{1}{2\sqrt{2}}\log\left|\frac{\tan x-\sqrt{2\tan x}+1}{\tan x+\sqrt{2\tan x}+1}\right|+c$$

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33. Evaluate $\int \frac{1}{\sin x-\sin 2x}dx.$

A.

B.

C.

D.

Answer: $-\frac{1}{2}\log|\cos x-1|-\frac{1}{6}\log|\cos x+1|+\frac{2}{3}\log|1-2\cos x|+c$

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34. Evaluate :

$\int x^5 \sin x^3 dx$

A.

B.

C.

D.

Answer: $\frac{1}{3}\left[-x^3\cos x^3+\sin x^3\right]+c$

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35. Evaluate $\int \sec^3 x dx$.

A.

B.

C.

D.

Answer: $\frac{1}{2}[\sec x \tan x + \log|\sec x + \tan x|] + c$

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36. $\int e^{ax} \cos(bx + c) dx$

A.

B.

C.

D.

Answer: $\frac{e^{ax}}{a^2+b^2}[a\cos(bx+c)+b\sin(bx+c)]+c$

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37. Evaluate :

$$\int \sin^{-1}\left(\frac{6x}{1+9x^2}\right)dx$$

A.

B.

C.

D.

Answer: $2x\tan^{-1}3x-\frac{1}{3}\log\left|1+9x^2\right|+c$

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38. $\int \cos\sqrt{x}\,dx$

A.

B.

C.

D.

Answer: $2\left[\sqrt{x}\sin\sqrt{x}+\cos\sqrt{x}\right]+c$

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39. Evaluate :

$$\int x^3\tan^{-1}x\,dx$$

A.

B.

C.

D.

Answer: $\left(\frac{x^4-1}{4}\right)\tan^{-1}x-\frac{x^3}{12}+\frac{x}{4}+c$

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40. $\int e^{2x} \cdot \left\{ \frac{1+\sin 2x}{1+\cos 2x} \right\} dx$

A.

B.

C.

D.

Answer: $\frac{1}{2} e^{2x} \tan x + c$

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41. Evaluate :

$$\int \left[\frac{1}{\log x} - \frac{1}{(\log x)^2} \right] dx$$

A.

B.

C.

D.

Answer: $\frac{x}{\log x} + c$

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42. Evaluate: $\int \sqrt{2ax - x^2} dx$

A.

B.

C.

D.

Answer: $\left(\frac{x-a}{2}\right)\sqrt{2ax - x^x} + \frac{a^2}{2}\sin^{-1}\left(\frac{x-a}{a}\right) + c$

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43. $\int \frac{(x^2+1)e^x}{(x+1)^2} dx$

A.

B.

C.

D.

Answer: $e^x\left(\frac{x-1}{x+1}\right)+c$

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44. $\int x^3 \sin^{-1}\left(\frac{1}{x}\right) dx$

A.

B.

C.

D.

Answer: $\frac{x^4}{4}\sin^{-1}\left(\frac{1}{x}\right)+\frac{x^2+2}{12}\sqrt{x^2-1}+c$

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45. Evaluate :

$$\int\left\{\log(\log x)+\frac{1}{(\log x)^2}\right\}dx$$

A.

B.

C.

D.

Answer: $x\log|\log x|-\frac{x}{\log x}$

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46. $\int (6x+5)\sqrt{6+x-2x^2}dx$

A.

B.

C.

D.

Answer:

$-2\left(6+x-x^2\right)^{\frac{3}{2}}+8\left[\frac{2x-1}{4}\sqrt{6+x-x^2}+\frac{25}{8}\sin^{-1}\left(\frac{2x-1}{5}\right)\right]+c$

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47. Evaluate $\int \frac{1}{1+x^3}dx$

A.

B.

C.

D.

Answer: $\frac{1}{3}\log|x+1| - \frac{1}{6}\log|x^2-x+1| + \frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right) + c$

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48. Evaluate :

$$\int \tan^{-1}\left(\frac{x-5}{1+5x}\right)dx$$

A.

B.

C.

D.

Answer: $x\tan^{-1}x - \frac{1}{2}\log|1+x^2| - x\tan^{-1}5 + c$

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49. Evaluate: $\int \frac{1}{5+4\cos x}dx$

A.

B.

C.

D.

Answer: $\frac{2}{3}\tan^{-1}\left(\frac{1}{3}\tan.\ \frac{x}{2}\right)+c$

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50. $\int_0^{\frac{\pi}{4}} \frac{\sin x+\cos x}{9+16\sin 2x}dx$

A.

B.

C.

D.

Answer: $\frac{1}{20}\log 3$

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51. $\int_0^{\frac{\pi}{2}} \cos 2x \log \sin x dx$

A.

B.

C.

D.

Answer: $-\pi/4$

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52. Evaluate the following definite integrals:

$\int_0^1 x\sqrt{\frac{1-x^2}{1+x^2}}dx$

A.

B.

C.

D.

Answer: $\frac{\pi}{4} - \frac{1}{2}$

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53. $\int_0^{1/\sqrt{2}} \frac{\sin^{-1} x}{(1-x^2)^{3/2}} dx = ?$

A.

B.

C.

D.

Answer: $\frac{\pi}{4} - \frac{1}{2}\log 2$

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54. Evaluate the following definite integrals:

$$\int_0^{\pi/2} \frac{\sin 2x}{\sin^4 x + \cos^4 x} dx$$

A.

B.

C.

D.

Answer: $\frac{\pi}{2}$

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55. $\int_0^1 \sin\left\{2\tan^{-1}\sqrt{\frac{1+x}{1-x}}\right\} dx =$

A.

B.

C.

D.

Answer: $\pi / 4$

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56. Evaluate the following definite integrals:

$$\int_0^{\pi/2} \frac{1 - \sin x}{x + \cos x} dx$$

A.

B.

C.

D.

Answer: $\log\left(\frac{\pi}{2}\right)$

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57. Evaluate the following definite integrals:

$$\int_0^1 x \log\left(1+\frac{x}{2}\right) dx$$

A.

B.

C.

D.

Answer: $\frac{3}{4}+\frac{3}{2}\frac{\log 2}{3}$

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58. Evaluate the following definite integrals:

$$\int_{-1}^{1/2} |x \cos \pi x| dx$$

A.

B.

C.

D.

Answer: $\frac{3}{2\pi} - \frac{1}{\pi^2}$

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59. $\int_{-\pi}^{\pi} (\cos ax - \sin bx)^2 dx$

A.

B.

C.

D.

Answer: $2\pi + \frac{1}{2a}\sin 2a\pi - \frac{1}{2b}\sin 2b\pi$

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60. Evaluate :

$$\int_2^5 [|x-2|+|x-3|+|x-4|]dx$$

A.

B.

C.

D.

Answer: $\frac{1}{2}$

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61. Evaluate : $\int_0^{\pi} \frac{x \sin x}{1+\sin x} dx$

A.

B.

C.

D.

Answer: π

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62. $\int_{-1}^{1} e^{\tan^{-1}x}\left[\frac{1+x+x^2}{1+x^2}\right]dx$

A.

B.

C.

D.

Answer: $e^{\pi/4}+e^{-\pi/4}$

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63. Evaluate: $\int_0^{\pi}\frac{x\sin x}{1+\cos^2 x}\,dx$

A.

B.

C.

D.

Answer: $\frac{1}{4}\pi^2$

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64. Evaluate :

$$\int_0^2 \left[x^2\right] dx$$

A.

B.

C.

D.

Answer: $5 - \sqrt{3} - \sqrt{2}$

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65. Evaluate : $\int_0^{\frac{\pi}{2}} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x} dx$

A.

B.

C.

D.

Answer: $\frac{\pi^2}{16}$

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66. Evaluate $\int_0^{\pi} \frac{x}{\left(a^2 \cos^2 x + b^2 \sin^2 x\right)} dx.$

A.

B.

C.

D.

Answer: $\frac{\pi^2}{2a}$

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67. Evaluate of each of the following integral: $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt{\tan x}} dx$

A.

B.

C.

D.

Answer: $\frac{\pi}{12}$

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68. Evaluate the following integral: $\int_{-\pi/2}^{\pi/2} (\sin|x| + \cos|x|)dx$

A.

B.

C.

D.

Answer: 2

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69. Evaluate $\int_0^{\pi} \frac{e^{\cos x}}{e^{\cos x} + e^{-\cos x}} dx.$

A.

B.

C.

D.

Answer: $\frac{\pi}{2}$

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70. $\int_0^{\pi} \frac{x \tan x}{\sec x + \cos x} dx$ is

A.

B.

C.

D.

Answer: $\frac{\pi^2}{4}$

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71. Evaluate the following integral: $\int_{-a}^{a} \sqrt{\frac{a-x}{a+x}} dx$

A.

B.

C.

D.

Answer: $a\pi$

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72. Integrate the functions $\frac{\sin^{-1}\sqrt{x} - \cos^{-1}\sqrt{x}}{\sin^{-1}\sqrt{x} + \cos^{-1}\sqrt{x}}, x \in [0, 1]$

A.

B.

C.

D.

Answer: $\frac{2(2x-1)}{\pi}\sin^{-1}\sqrt{x} + \frac{2\sqrt{x-x^2}}{\pi} - x + c$

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73. $\int \sqrt{\frac{1-\sqrt{x}}{1+\sqrt{x}}}dx$

A.

B.

C.

D.

Answer: $-2\sqrt{1-x}+\cos^{-1}\sqrt{x}+\sqrt{x-x^2}+c$

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74. Evaluate

$\int \frac{x^2e^x}{(x+7)^2}dx$

A.

B.

C.

D.

Answer: $\frac{x-2}{x+2}e^x + c$

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

A.

B.

C.

D.

Answer: $\frac{\sin x - x\cos x}{x\sin x + \cos x} + c$

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76. Evaluate : $\int \sin^{-1}\sqrt{\frac{x}{a+x}}dx$

A.

B.

C.

D.

Answer: $(x+a)\tan^{-1}\sqrt{\frac{x}{a}} - \sqrt{ax} + c$

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77. $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin x + \cos x}{\sqrt{\sin 2x}}dx$

A.

B.

C.

D.

Answer: $2\sin^{-1}.\frac{\sqrt{3}-1}{2}$

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78. Evaluate

$$\int \frac{\sin x}{\sin 4x} dx$$

A.

B.

C.

D.

Answer: $\frac{1}{8}\log\left|\frac{1-\sin x}{1+\sin x}\right| - \frac{1}{4\sqrt{2}}\log\left|\frac{1+\sqrt{2}\sin x}{1-\sqrt{2}\sin x}\right| + c$

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79. Evaluate $\int_{-1\frac{3}{2}} |x\sin(\pi x)| dx$

A.

B.

C.

D.

Answer: $\frac{3}{\pi} + \frac{1}{\pi^2}$

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80. $\int \frac{\sin(x-1)}{\sin(x+1)} dx =$

A.

B.

C.

D.

Answer: $(\cos 2a)(x+a) - (\sin 2a)\log|\sin(x+a)| + c$

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81. Evaluate : $\int \frac{x^2}{(x^2+4)(x^2+9)} dx$

A.

B.

C.

D.

Answer: $-\frac{4}{5}\log|x^2+4| + \frac{9}{5}\log|x^2+9| + c$

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82. Evaluate: $\int \frac{\cos 5x + \cos 4x}{1 - 2\cos 3x} dx$

A.

B.

C.

D.

Answer: $-\left(\frac{1}{2}\sin 2x + \sin x\right) + c$

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Six Mark Questions

1. $\int \frac{x^5 + 4}{x^5 - x} dx$

A.

B.

C.

D.

Answer:

$x - 4\log|x| + \frac{5}{4}\log|x - 1| + \frac{3}{4}\log|x + 1| + \log\left|x^2 + 1\right| \frac{-1}{2}\tan^{-1} x + c$

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2. $\int \frac{2e^t}{e^{3t} - 6e^{2t} + 11e^t - 6} dt$

A.

B.

C.

D.

Answer: $\log \left| \frac{(e^t - 1)(e^t - 3)}{(e^t - 2)^2} \right| + c$

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3. $\int \frac{2x^3}{(x+1)(x-3)^2} dx$

A.

B.

C.

D.

Answer: $2x - \frac{1}{8}\log|x+1| + \frac{81}{8}\log|x-3| - \frac{27}{2(x-3)} + c$

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4. Evaluate the following integrals:

$$\int \frac{1+\sin x}{\sin x(1+\cos x)}dx$$

A.

B.

C.

D.

Answer: $\frac{1}{4}\log\left|\frac{1-\cos x}{1+\cos}\right| + \frac{1}{2(1+\cos)} + \tan.\frac{x}{2} + c$

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5. $\int_0^{\pi/2} \left(\sqrt{\tan x} + \sqrt{\cot x}\right) dx$

A.

B.

C.

D.

Answer: $\frac{\pi}{\sqrt{2}}$

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6. Evaluate: $\int_0^1 x\sqrt{\frac{1-x^2}{1+x^2}}dx$

A.

B.

C.

D.

Answer: $\frac{\pi - 2}{4}$

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7. Evaluate the following integrals:

$$\int_0^{\pi/2} \frac{\cos x}{1 + \cos x + \sin x} dx$$

A.

B.

C.

D.

Answer: $\frac{\pi}{4} - \frac{1}{2}\log 2$

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8. Evaluate the following integrals as limit of sums:

$$\int_2^4 (2x+1)dx$$

A.

B.

C.

D.

Answer: 14

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9. Evaluate the following integrals as limit of sums:

$$\int_0^2 (x^2+3)dx$$

A.

B.

C.

D.

Answer: $\frac{26}{3}$

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10. Evaluate the following integrals as limit of sums:

$$\int_1^3 \left(3x^2 - 2x + 4\right) dx$$

A.

B.

C.

D.

Answer: 26

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11. Evaluate the following integrals as limit of sums:

$$\int_0^4 (3x^2 + e^{2x})\,dx$$

A.

B.

C.

D.

Answer: $\frac{1}{2}(127 + e^8)$

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12. Evaluate the following integrals as limit of sums:

$$\int_0^1 e^{2-3x}\,dx$$

A.

B.

C.

D.

Answer: $\frac{1}{3}\left(e^2 - \frac{1}{e}\right)$

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13. Evaluate the following integrals as limit of sums:

$$\int_0^1 (3x^2 + 2x + 1)\,dx$$

A.

B.

C.

D.

Answer: 3

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14. Evaluate: $\int \frac{1}{(\sin x - 2\cos x)(2\sin x + \cos x)dx}$

A.

B.

C.

D.

Answer: $\frac{1}{5}\log\left|\frac{\tan x - 2}{2\tan x + 1}\right| + c$

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15. $\int_0^1 \frac{\log(1+x)}{1+x^2}dx$

A.

B.

C.

D.

Answer: $\frac{\pi}{8}\log 2$

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16. $\int_0^{\pi/2}(2\log\sin x - \log\sin 2x)dx =$

A.

B.

C.

D.

Answer: $\frac{\pi}{2}\log.\frac{1}{2}$

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17. Evaluate: $\int_0^1 x\left(\tan^{-1}x\right)^2 dx$

A.

B.

C.

D.

Answer: $\frac{\pi^2}{16} - \frac{\pi}{4} + \frac{1}{2}\log 2$

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18. Prove that: $\int_0^{\pi/2} \log(\sin x)dx = \int_0^{\pi/2} \log(\cos x)dx = \frac{-\pi}{2}\log 2$

A.

B.

C.

D.

Answer: $\frac{-\pi}{2}\log 2$

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19. Prove that $\int_0^1 \tan^{-1}\left(\frac{1}{1-x+x^2}\right)dx = 2\int_0^1 \tan^{-1} x dx$. Hence or otherwise, evaluate the integral $\int_0^1 \tan^{-1}(1-x+x^2)dx$

A.

B.

C.

D.

Answer: $\log 2$

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20. Evaluate : $\int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{s \in x + \cos x} dx$

A.

B.

C.

D.

Answer: $\frac{1}{\sqrt{2}}\log\left|\sqrt{2}+1\right|$

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