MATHS

BOOKS - ARIHANT MATHS (HINGLISH)

INTEGRALS

EXAMPLES

1. Write the anti derivative of $\left(3\sqrt{x}+\frac{1}{\sqrt{x}}\right)$.

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2. Evaluate: $\int \cos^{-1}(\sin x)\, dx$

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3. Integrate : $\int \frac{1-\sin x}{\cos^2 x} dx.$

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4. Evaluate: $\int \frac{x^3-1}{x^2}\, dx$

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5. Evaluate : $\int \frac{\sin^2 x}{1+\cos x} dx.$

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6. Evaluate the following integrals:

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

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7. Evaluate the following integrals:

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

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8. Evaluate:

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

(ii) $\int \sqrt{1 + \sin 2x} dx.$

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9. Show that

$$f(x) = \tan x - \cot x - x + \frac{\pi}{4} + 1$$ if:

$$f'(x) = \sec^2 x + \cos ec^2 x - 1 \text{ and } f(x) = 1, \text{ when } x = \frac{\pi}{4}.$$

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10. Integrate the following w.r.t x:

$$\frac{x^2+3x+1}{\sqrt{1-x^2}}$$

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11. Integrate: $\int \frac{x^3}{\sqrt{1-x^8}}dx$

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12. Find $\int \frac{\sqrt{x}}{\sqrt{a^3-x^3}}dx$

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13. $\int \frac{\sec^2 x}{\sqrt{\tan^2 x+4}}dx$

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14. $\int \frac{\left(x^2+\sin^2 x\right)\sec^2 x}{1+x^2}dx$

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15. Find $\int \frac{\sin 2x \cos 2x dx}{\sqrt{9-\cos^4(2x)}}$

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16. $\int \frac{dx}{a^2\sin^2 x + b^2\cos^2 x}$

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17. Integrate: $\int \frac{dx}{2+\cos x}$

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18. Integrate : $\int e^x \sin x dx.$

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

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20. Integrate: $\int e^x \sin^2 x dx.$

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21. Evaluate: $\int \frac{e^{\tan^{-1} x}}{1 + x^2} dx$

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22. Evaluate : $\int \frac{1}{x^2 - 16} dx.$

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23. Evaluate: $\int \frac{dx}{x^2 - 6x + 13}$

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

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25. Evaluate $\int -115x^4 \sqrt{x^5 + 1} dx$

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26. $\int \frac{dx}{5+4\cos x}$

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27. Evaluate : $\frac{\int_0^{\pi}}{4} \frac{\sin x+\cos x}{16+9\sin 2x}$

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28. Evaluate the following integrals: $\int_0^a \sin^{-1}\sqrt{\frac{x}{a+x}}dx$

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29. Evaluate the following :

$\int_0^{11/\sqrt{2}} \frac{\sin^{-1}x}{(1-x^2)^{3/2}}dx.$

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30. Evaluate : $\int_0^{\pi} e^{2x} \sin\left(\frac{\pi}{4} + x\right) dx$

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31. Evaluate: $\int_0^1 \sin^{-1}\left(x\sqrt{1-x} - \sqrt{x}\sqrt{1-x^2}\right) dx.$

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EXERCISE 7(a) SHORT ANSWER TYPE

1. Find an antiderivative (or integral) of the following cos 3x (ii) $3x^2 + 4x^3$ (iii) $(ax + b)^2$ (iv) $\sin 2x - 4e^{3x}$

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2. Write down the integral of the following

$x^4 + x^{-5}$

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3. Write down the integral of the following (i) $\frac{1}{x}, x \neq 0$ (ii) $x + \frac{1}{x}, x \neq 0$

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4. Write down the integral of the following (i) $x^{2/3} + 1$ (ii) $\left(\frac{3}{\sqrt{x}} + 5x^4\right)$

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5. Write down the integral of the following

cos 2x

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6. Write down the integral of the following (i) $\sin x + \cos x$ (ii) $\cos ecx(\cos ecx + \cot x)$

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7. Write down the integral of the following (i) 5^x (ii) $x^{3/2} + 2e^x - \frac{1}{x}$.

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8. Write down the integral of the following

$2x - 3\cos x + e^x$

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9. Evaluate the following integrals :

$$\int \left(3\cos ec^2 x - 5x + \sin x\right) dx.$$

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10. Evaluate the following integrals :

$$\int \left(\sin x + \cos x + x^{5/2}\right) dx.$$

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EXERCISE 7(a) LONG ANSWER TYPE QUESTION

1. $\int \sqrt{1 - \cos 2x}\, dx$

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2. Evaluate the following :

$$\int (\cos x + \cos ec^2 x - x^8 + 1)\, dx.$$

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3. Evaluate the following :

$$\int (e^x + 3\cos x - 4x^3 + 2)\, dx.$$

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4. $\int (e^{x \log a} + e^{a \log x} + e^{a \log a})\, dx$

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5. Evaluate the following :

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

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6. Evaluate the following :

$$\int \frac{(x-4)^3}{x^2} dx.$$

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7. Evaluate: $\int \frac{1}{1+\sin x} dx$

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8. Evaluate the following :

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

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9. If $f'(x) = x - \frac{3}{x^2}$, $f(1) = \frac{11}{2}$, find f(x).

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10. If $f'(x) = a\sin x + b\cos x$ and $f'(0) = 4,\ f(0) = 3,\ f\left(\frac{\pi}{2}\right) = 5$, find $f(x)$.

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EXERCISE 7(b) SHORT ANSWER TYPE Frequently Asked Question FAQ

1. Evaluate the following

$$\int \frac{2x+9}{x^2+9x+30}dx.$$

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

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3. Evaluate: $\int \frac{dx}{\sqrt{x+3}-\sqrt{x+2}}.$

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4. Find: $\int \cos 6x\sqrt{1+\sin 6x}dx.$

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5. Integrate: $\int \cos^3 x \sin^4 x dx.$

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6. Evaluate: $\int \frac{\sin 2x}{a\cos^2 x + b\sin^2 x} dx.$

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7. Evaluate: $\int \frac{1}{1+\tan x} dx.$

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8. $(i) \int \frac{\sin(x-a)}{\sin x} dx$

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9. Integrate : $\int \frac{\tan^4 \sqrt{x} \sec^2 \sqrt{x}}{\sqrt{x}} dx.$

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10. Evaluate: $\int \frac{\left(x^4 - x\right)^{1/4}}{x^5} dx$

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11. $\int \frac{\sin x}{\sqrt{1 + \sin x}} dx$

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EXERCISE 7(b) SHORT ANSWER TYPE

1. (i) $\int \sin mx dx$

(ii) $\int 2x \sin\left(x^2 + 1\right) dx$ (iii) $\int x\sqrt{1 + 2x^2} dx.$

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2. Evaluate $\int \frac{\sin(\log x)}{x} dx$

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3. (i) $\int \frac{x}{9-4x^2}dx.$

(ii) $\int (ax+b)^3 dx$

(iii) $\int \frac{\sec x}{\log(\sec x+\tan x)}dx.$

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4. $\int \frac{x^2}{(2+x^3)^3}dx =$

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5. (i) $\int \tan^2(2x-3)dx$

(ii) $\int \sec^2(7-4x)dx$

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

(ii) $\int \frac{\sin x}{(1+\cos x)^2} dx.$

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

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8. $\int \sqrt{ax+b} dx.$

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9. $\int \frac{6x-8}{3x^2-8x+5} dx$

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10. $\int \frac{\cos x - \sin x}{(\cos x + \sin x)dx}$

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11. (i) $\int x\sqrt{x+2}dx$

(ii) $\int \frac{x}{\sqrt{x+4}}dx, x > 0$

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

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

(ii) $\int \frac{1}{x-\sqrt{x}}dx.$

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14. $\int x^2 \sin x^3 dx$

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EXERCISE 7(b) LONG ANSWER TYPE QUESTION

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

(ii) $\int \sin^3 x \cos^2 x dx$

(iii) $\int \sin^3 x \cos^3 x dx$

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2. $\int \sin x \sin(\cos x) dx.$

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3. (i) $\int \tan^3 x dx$ (ii) $\int \tan^4 x dx$.

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

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

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6. (i) $\int \frac{1 + \tan x}{x + \log \sec x} dx$

(ii) $\int \frac{1 + \cot x}{x + \log \sin x} dx$.

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7. $\int \frac{\sin 2x}{\sin 4x} dx$

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8. Evaluate $\int e^{3\log x}\left(x^4+1\right)^{-1} dx$

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

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10. Evaluate :

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

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11. $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx$

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

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

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13. $\int \frac{\cos(x+a)}{\sin(x+b)} dx$

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14. $\int \frac{1}{\sin(x-a)\cos(x-b)} dx =$

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15. $\int \sec^4 x dx$

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16. (i) $\int \frac{1-\tan x}{1+\tan x} dx$

(ii) $\int \frac{1-\cot x}{1+\cot x} dx$

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17. $\int x e^{x^2} dx$

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18. $\int \frac{e^{2x}-1}{e^{2x}+1} dx = ?$

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

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20. (i) $\int e^x \sec^2(e^x)dx$

(ii) $\int e^x \cos ec^2(e^x)dx$

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21. $\int \frac{(x+1)e^x}{\cos^2(xe^x)}dx = ?$

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

(ii) $\int \frac{e^{\sin^{-1}x}}{\sqrt{1-x^2}}dx$

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

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23. (i) $\int \frac{\log x}{x} dx$

(ii) $\int \frac{(\log x)^2}{x} dx$

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24. $\int \frac{(x+1)(x+\log x)^2}{x} dx = ?$

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25. (i) $\int \frac{\sin(\log x)}{x} dx$

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

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26. $\int 2x \sec^3(x^2+3)\tan(x^2+3)\,dx$

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27. Evaluate: $\int x^2 e^{x\,\hat{}\,3}\cos(e^{x\,\hat{}\,3})\,dx$

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28. (i) $\int \frac{\cos x - \sin x}{\sqrt{1+\sin 2x}}\,dx$

(ii) $\int \frac{\cos x}{\left(\cos\left(\frac{x}{2}\right)+\sin\left(\frac{x}{2}\right)\right)}\,dx$

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EXERCISE (7d) SHORT ANSWER TYPE QUESTIONS

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

(ii) $\int \frac{dx}{\sqrt{4-x^2}}$

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

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

(iii) $\int \frac{dx}{4+9x^2}$

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

(ii) $\int \frac{1}{9x^2+6x+5} dx$

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

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5. (i) $\int \frac{1}{\sqrt{4+x^2}} dx$

(ii) $\int \frac{1}{\sqrt{9+x^2}} dx$

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

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6. $\int \frac{1}{\sqrt{a^2+b^2x^2}} dx$

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

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8. (i) $\int \frac{1}{\sqrt{x^2-25}} dx$

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

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9. Evaluate: $\int x \sqrt{x^4+1}\, dx$

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

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11. (i) $\int \frac{dx}{e^x + e^{-x}}$

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

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12. (i) $\int \frac{3x^2}{x^6 + 1} dx$

(ii) $\int \frac{3x}{1 + 2x^4} dx$

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13. v36.1

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14. $\int \frac{x^2}{\sqrt{x^6 - a^6}} dx$

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

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16. (i) $\int \frac{2^x}{\sqrt{1-4^x}} dx$

(ii) $\int \sqrt{e^x - 1} dx$

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EXERCISE (7d) LONG ANSWER TYPE QUESTION (I)

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

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2. (i) $\int \frac{1}{4\sin^2 x + 5\cos^2 x} dx$

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

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3. $\int \frac{dx}{1 + 3\sin^2 x}$.

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4. $\int \frac{dx}{1 + 3\sin^2 x + 8\cos^2 x}$

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5. $\int \frac{\cos x}{\sqrt{4 - \sin^2 x}} dx$

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

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7. (i) $\int \sqrt{\frac{a+x}{a-x}}dx$ (ii) $\int \sqrt{\frac{a-x}{a+x}}dx$

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8. $\int \frac{(\sin x + \cos x)}{\sqrt{\sin 2x}}dx$

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9. Prove that:

$$\int \frac{dx}{x\sqrt{x^2-a^2}} = \frac{1}{a}\sec^{-1}\left(\frac{x}{a}\right) + c$$

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EXERCISE 7(e) FAQ

1. Evaluate: $\int x^2 e^{3x} dx$

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

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3. Evaluate the following

(i) $\int x \log(1+x) dx$

(ii) $\int x \log^2 x dx$

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4. $\int x^2 \tan^{-1} x dx$

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5. Evaluate: $\int \log x dx$

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

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

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8. Evaluate :

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

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7(e)SHORT ANSWER QUESTION TYPE

1. v31

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2. $\int x \sin x dx$

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3. Evaluate $\int x \sin 3x dx$.

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4. Evaluate $\int x \cos x dx$.

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5. (i) $\int x \sec^2 x dx$ (ii) $\int x \cos^2 x dx$

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

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7. (i) $\int \sec^3 x dx$ (ii) $\int \cos ec^3 x dx$

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8. $\int \sin \sqrt{x} dx$

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9. (i) $\int x^2 e^x dx$

(ii) $\int x^2 e^{3x} dx$

(ii) $\int x^3 e^x dx$

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10. $\int x^2 e^{-2x} dx$

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11. (i) $\int x^2 \sin x dx$

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

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

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

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14. Evaluate: (i) $\int x\cos^3 x^2 \sin x^2\, dx$ (ii) $\int \sin^7 x\, dx$

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15. (i) $\int x^3 \sin x^2 dx$ (ii) $\int x^3 \cos x^2 dx$

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16. $\int x^{2n-1} \cos x^n dx$

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

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18. $\int x \log x, dx$

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19. (i) $\int x^2 \log x dx$

(ii) $\int (x^2 + 1) \log x dx$

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EXERCISE 7(e) LONG ANSWER TYPE QUESTION (I)

1. $\int x^3 \log x dx$

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2. Evaluate : $\int x^n \log x dx.$

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3. Evaluate: $\int \frac{\log(x+2)}{(x+2)^2} dx$

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4. $\int \log(5+t) dt$

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5. $\int (\log x)^2 dx =$

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6. $\int \sin x . \log \cos x dx$

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

(ii) $\int x \cos^{-1} x dx$

(iii) $\int x \tan^{-1} x dx$

(iv) $\int x \cot^{-1} x dx$

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

(ii) $\int \cos^{-1} x dx$

(iii) $\int \cot^{-1} x dx$

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9. (i) $\int \tan^{-1} \sqrt{x} dx$ (ii) $\int \sin^{-1} \sqrt{x} dx$

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10. (i) $\int \frac{x \cos^{-1} x}{\sqrt{1-x^2}} dx$ (ii) $\int \frac{x \tan^{-1} x}{(1+x^2)^{3/2}} dx$

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

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12. $\int \tan^{-1}\left(\frac{3x - x^3}{1 - 3x^2}\right) dx$

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

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

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15. $\int x^2 \log x dx.$

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EXERCISE 7(e) LONG ANSWER TYPE QUESTION (II)

1. $\int \cos 2\theta . \ln\left(\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}\right) d\theta$

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EXERCISE 7(f)

1. $\int e^x \cos x . dx$

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2. $\int e^x \sin 2x dx$

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3. $\int e^x \cos 2x dx$

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4. $\int e^x \cos 3x dx$

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5. (i) $\int e^{3x} \cos 5x dx$

(ii) $\int e^{3x} \sin 4x dx$

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6. $\int e^{2x} \sin x dx$

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7. $\int e^{2x} \sin x \cos x dx$

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8. Evaluate $\int e^{x} \cos^{2} x dx$

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9. $\int \cos(\log x) dx$

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10. $\int x^{2} e^{x^{3}} \cos x^{3} dx$

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11. Evaluate: $\int e^{ax} \cos bx \, dx$

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12. Evaluate: $\int e^{ax} \sin(bx + c) \, dx$

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EXERCISE 7(f) FAQ

1. Evaluate the following integrals:

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

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2. Integrate: $\int e^x \left(\frac{x^2 + 1}{(x + 1)^2} \right) dx.$

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3. Find: $\int \frac{2x-5}{(2x-3)^3} e^{2x} dx.$

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4. Find: $\int e^x \frac{\sqrt{1+\sin 2x}}{1+\cos 2x} dx.$

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5. Find $\int \left[\log(\log x) + \frac{1}{(\log x)^2} \right] dx$

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EXERCISE 7(g) SHORT TYPE QUESTION

1. $\int e^x(\cos x + \sin x)dx$

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

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3. Evaluate: $\int e^x\left(\frac{1}{x} - \frac{1}{x^2}\right)dx$.

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4. $\int e^x(\tan x + 1)\sec x dx$

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5. Evaluate $\int \frac{e^x(1+\sin x)}{1+\cos x}dx$

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6. Evaluate: $\int e^x\left(\frac{1-\sin x}{1-\cos x}\right)dx$

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7. Evaluate: $\int e^x\left(\frac{\sin 4x-4}{1-\cos 4x}\right)dx$

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8. $\int e^x(\cot x+\log\sin x)dx$

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9. $\int \cos ecx(\cot x - 1)e^x dx$

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10. $\int e^x [\sec x + \log(\sec x + \tan x)]dx = ?$

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11. $\int e^x \left(\sin^{-1} x + \frac{1}{\sqrt{1-x^2}}\right)dx$

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13. Evaluate $\int \frac{xe^x}{(1+x)^2} dx$

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EXERCISE 7(g) LONG ANSWER TYPE QUESTION (I)

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

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2. (i) $\int \frac{2-x}{(1-x)^2} e^x dx$

(ii) $\int \frac{xe^{2x}}{(1+2x)^2} dx$ (iii) $\int e^{2x} \left(\frac{2x-1}{4x^2} \right) dx$

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3. $\int e^x \frac{1+\sin x \cos x}{\cos^2 x} dx$ is equal to

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4. Evaluate: $\int\{s \in (\log x) + \cos(\log x)\}dx$

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

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6. (i) $\int e^{2x}\left(\frac{1+\sin 2x}{1+\cos 2x}\right)dx$

(ii) $\int e^{2x}\left(\frac{\sin 4x - 2}{1-\cos 4x}\right)$

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7. $\int \frac{2+\sin x}{1+\cos x}e^{x/2}dx$

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8. $\int\left\{\frac{1}{(\log x)}-\frac{1}{(\log x)^2}\right\}dx = ?$

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EXERCISE 7 (h) SHORT ANSWER TYPE QUESTION

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

(ii) $\int\frac{1}{x^2-9}dx$

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

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3. Evaluate: $\int \frac{1}{a^2 - b^2x^2} dx$

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EXERCISE 7(h) FAQ

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

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2. Evaluate: $\int \frac{(x-1)(x-2)(x-3)}{(x-4)(x-5)(x-6)} dx$

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

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

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5. Find : $\int\left(\frac{\cos\theta}{(4+\sin^2\theta)(5-4\cos^2\theta)}d\theta\right.$

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EXERCISE 7(i) SHORT ANSWER TYPE QUESTIONS

1. (i) $\int \frac{xdx}{x^2+3x+2}$

(ii) $\int \frac{x}{x^2+5x+6}dx$

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2. $\int \frac{x}{(x^2+1)(x^2+2)}$ dx is equal to _

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3. $\int \frac{1}{x^2-5x+6}dx$

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4. $\int \frac{1}{x-x^3}dx$

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EXERCISE 7(i) LONG ANSWER TYPE QUESTIONS (I)

1. $\int \frac{x+1}{x^2+4x-5}dx$

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

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

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

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4. $\int \frac{1-x^2}{x(1-2x)}dx =$

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5. integrate this $\int \frac{x^2+1}{x^2-5x+6}dx$

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

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

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

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

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10. $\int \frac{ax^2 + bx + c}{(x-a)(x-b)(x-c)} dx$; a, b, c are distinct

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

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12. $\int \frac{2x}{x^2 + 3x + 2} dx$

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

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

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14. $\int \frac{5x^3 + 18x^2 - 10x - 6}{x(x+3)(5x-2)} dx$

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

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

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

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

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

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20. (i) $\int \frac{1}{1-x^3} dx$

(ii) $\int \frac{1}{x^3-1} dx$

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

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

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

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22. $\int \frac{1}{x + x^2 + x^3} dx$

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23. $\int \frac{x^4}{x^4 - 16} dx$

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

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

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25. Evaluate $\int \frac{5x}{(x + 1)(x^2 + 9)} dx$

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

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27. (i) $\int \frac{1}{(x^2+1)(x^2+4)}dx$ (ii) $\int \frac{1}{(x^2+1)(x^2+2)}dx$

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28. (i) $\int \frac{x^2+1}{(x^2+4)(x^2+25)}dx$ (ii) $\int \frac{2x^2+1}{x^2(x^2+4)}dx$

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

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

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

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31. (i) $\int \frac{\sin 2x}{(1+\sin x)(2-\sin x)}dx$

(ii) $\int \frac{\cos x}{(1+\sin x)(2-\sin x)}dx$

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

(iv) $\int \frac{(3\sin x-2)\cos x}{13-\cos^2 x-7\sin x}dx$

(v) $\int \frac{\sin\theta}{(4+\cos^2\theta)(2-\sin^2\theta)}d\theta.$

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32. Find $\int \frac{(3\sin\varphi-2)\cos\varphi}{5-\cos\varphi-4\sin\varphi}d\varphi$

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33. $\int \frac{\cos x}{(1+\sin x)(2+\sin x)} dx$

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34. (i) $\int \frac{e^x dx}{e^x(e^x-1)}$

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

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

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35. $\int \frac{\sec^2 x}{(\tan x+1)(\tan x+2)} dx$

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36. (i) $\int \frac{\log x}{x(1+\log x)(2+\log x)} dx$

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37. $\int \frac{\sec x}{1+\cos ecx} dx$

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EXERCISE 7(i) LONG ANSWER QUESTION TYPE (II)

1. $\int \frac{2\sin 2\theta - \cos\theta}{6 - \cos^2\theta - 4\sin\theta} d\theta$

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2. $\int \frac{\tan x + \tan^3 x}{1+\tan^3 x} dx.$

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3. Evaluate the following Integrals :

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

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EXERCISE 7(j) FAQ

1. $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$

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2. Choose the correct answer $\int \sqrt{x^2-8x+7} dx$ (A) $\frac{1}{2}(x-4)\sqrt{x^2-8x+7} + 9\log\left|x-4+\sqrt{x^2-8x+7}\right| + C$ (B) $\frac{1}{2}(x+4)\sqrt{x^2-8x+7} + 9\log\left|x+4+\sqrt{x^2-8x+7}\right| + C$ (C) $\frac{1}{2}(x-4)\sqrt{x^2-8x+7} - 3\sqrt{2}\log\left|x-4+\sqrt{x^2-8x+7}\right| + C$

(D) `1/2(x-4)sqrt(x^2-8x+7)-

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

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

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5. Evaluate : $\int \frac{e^x}{\sqrt{5-4e^x-e^{2x}}}\,dx$

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6. Evaluate: $\int \frac{\sec^2 x}{\sqrt{\tan^2 x+2\tan x+5}}dx$

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7. Evaluate: $\int \frac{\sin 2x}{\sqrt{\sin^4 x + 4\sin^2 x - 2}} dx.$

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EXERCISE 7(j) LONG ANSWER TYPE QUESTION (I)

1. (i) $\int \frac{dx}{\sqrt{x(1-2x)}}$

(ii) $\int \frac{dx}{\sqrt{2x - x^2}}$

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2. (i) $\int \frac{dx}{\sqrt{5 + 4x - x^2}}$

(ii) $\int \frac{dx}{\sqrt{8 + 3x - x^2}}$

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3. (i) $\int \frac{dx}{\sqrt{16-6x-x^2}}$

(ii) $\int \frac{dx}{\sqrt{7-6x-x^2}}$

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

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

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EXERCISE 7(k) LONG ANSWER TYPE QUESTION (I)

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

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2. $\int \frac{dx}{x\sqrt{x^2+3}}$

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

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

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

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6. $\int \frac{dx}{\sqrt{(2x - x^2)^3}}$

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7. (i) $\int \frac{dx}{x\sqrt{x^2 - 1}}$ (ii) $\int \frac{dx}{x\sqrt{ax - x^2}}$

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8. $\int \frac{dx}{(x - 1)\sqrt{x^2 + 4}}$

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

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10. $\int \frac{1}{(x^2+4)\sqrt{x^2-4}}dx$

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11. $\int \frac{\cos x}{\sin x + \sqrt{\sin x}}dx$

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

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SUB CHAPTER 7.3 EXERCISE 7(m)FAQ

1. Evaluate $\int_0^1 x^2 dx$ as the limit of a sum.

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2. Evaluate $\int_0^1 x^2 dx$ as the limit of a sum.

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3. Evaluate the following integrals as limit of sum: $\int_1^4 (3x^2 + 2x)\,dx$

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4. Evaluate: $\int_0^2 (x^2 + x + 1)\,dx$ as the limit of a sum.

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5. Evaluate: $\int_0^2 e^x dx$ as a limit of sum.

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6. Evaluate: $\int_1^3 \left(x^2 + 3x + e^x\right) dx$

A. $\left(-e^2 - 1\right)$

B. $\left(e^2 + 1\right)$

C. $\left(e^2 - 1\right)$

D. None of these

Answer: C

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7. Evaluate: $\int_{-1}^2 \left(e^{3x} + 7x - 5\right) dx$ as a limit of sums.

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8. Evaluate: $\int_a^b \sin x dx$ as the limit of a sum.

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9. Sketch the regions represented by the following:

(i) $\int_0^1 x^2 dx$ (ii) $\int_0^{\frac{\pi}{2}} \sin x dx$

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SUB CHAPTER 7.3 EXERCISE 7(m) LONG ANSWER TYPE QUESTION (I)

1. (i) $\int_a^b x dx$

(ii) $\int_1^2 x dx$

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2. (i) $\int_1^2 x^2 dx$

(ii) $\int_2^3 x^2 dx$

(iii) $\int_0^4 x^2 dx$

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3. (i) $\int_0^4 (x+1) dx$

(ii) $\int_0^5 (x+1) dx$

(iii) $\int_0^3 (x+4) dx$

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4. (i) $\int_0^4 (2x+3) dx$

(ii) $\int_0^4 (2x-1) dx$

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5. (i) $\int_1^4 (x^2 - x)\,dx$

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

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

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SUB CHAPTER 7.3 EXERCISE 7(n) FAQ

1. Evaluate: $\int_0^{\pi/2} e^x(\sin x - \cos x)\,dx$

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2. If $\int_0^a \frac{1}{4 + x^2}dx = \frac{\pi}{8}$, find the value of a.

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3. Evaluate: $\int_0^2 \sqrt{4-x^2}dx$

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4. Evaluate the following integrals:

(i) $\int_2^3 x^2 dx$

(ii) $\int_1^3 \frac{x}{(x+1)(x+2)}dx$

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5. Evaluate the following:

$\int_0^\pi \cos x dx$

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6. Evaluate :

$\int_0^2 (2x^2 + 3x + 1)\,dx$ by second Fundamental Theorem.

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7. Evaluate: $\int_0^{\pi/4} \sec x . \sqrt{\frac{1-\sin x}{1+\sin x}}\,dx$

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8. Evaluate the following integral: $\int_0^{\pi/2} \frac{x+\sin x}{1+\cos x}\,dx$

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9. IF $\int_0^a \sqrt{x}\,dx = 2a\int_0^{\pi/2} \sin^3 x\,dx$, find $\int_a^{a+1} x\,dx$.

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10. The marginal cost of a manufacture is given by:

$$MC = \frac{250x}{\sqrt{x^2 + 40}}$$

where 'x' is the number of units (in thousands) produced. If 'x' increases from 3,000 to 9,000 units, find the total increase in cost.

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SUB CHAPTER 7.3 EXERCISE 7(n) SHORT ANSWER TYPE QUESTIONS

1. (i) $\int_4^5 1dx$ (ii) $\int_{-1}^2 xdx$

(iii) $\int_0^4 x^{1/2}dx$

(iv) $\int_0^4 x^{3/2}dx$

(v) $\int_0^8 x^{5/3}dx$

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2. (i) $\int_2^3 \frac{1}{x} dx$

(ii) $\int_1^2 \frac{1}{x^2} dx$

(iii) $\int_1^e \frac{dx}{x}$

(iv) $\int_{-1}^1 (x+1) dx$

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3. $\int_2^4 (x^2 - 1) dx$

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4. (i) $\int_0^1 \frac{dx}{\sqrt{1-x^2}}$

(ii) $\int_0^1 \frac{dx}{\sqrt{1+x^2}}$

(iii) a $\int_1^{\sqrt{3}} \frac{dx}{1+x^2}$

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

(iv) $\int_0^{2/3} \frac{dx}{4+9x^2}$

(v) $\int_0^1 \frac{x}{x^2+1}dx$

(vi) $\int_2^3 \frac{x}{x^2+1}dx$

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5. (i) $\int_0^1 \frac{dx}{3x-4}$ (ii) $\int_1^3 \frac{dx}{7-2x}$

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6. $\int_0^1 x(1-x)^5 dx$

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7. Evaluate:

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

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8. (i) $\int_0^{\pi/2} \cos x dx$ (ii) $\int_{-\pi/2}^{\pi/2} \cos x dx$ (iii) $\int_0^{\pi/2} \cos 2x dx$

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9. (i) $\int_0^{\pi/4} \tan x dx$ (ii) $\int_{\pi/4}^{\pi/2} \cot x dx$

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10. (i) $\int_0^{\pi/4} \sec x dx$

(ii) $\int_{\pi/6}^{\pi/4} \cos ecx dx$

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11. $\int_0^1 3^x dx$

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12. (i) $\int_0^{\frac{\pi}{2}} \sin^2 x dx$

(ii) $\int_0^{\pi/2} \cos^2 x dx$

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13. $\int_0^{\pi/2} \sin^3 x dx$

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14. (i) $\int_0^{\pi} \left(\frac{\sin^2 x}{2} - \frac{\cos^2 x}{2} \right) dx$

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

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15. $\int_0^1 \left(xe^x + \sin\left(\frac{\pi x}{4}\right)\right) dx$

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16. Find the value of the following: $\int_0^1 \frac{dx}{1+x^2}$

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17. $\int_2^3 \frac{dx}{x^2-1}$

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18. Evaluate the following: $\int_1^2 \frac{5x^2}{x^2+4x+3}\, dx$

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19. (i) $\int_1^3 \frac{3x}{9x^2-1}dx$

(ii) $\int_2^3 \frac{x}{x^2+1}dx$

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20. $\int_{-\pi/4}^0 \frac{1+\tan x}{1-\tan x}dx$

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21. If $\int_0^k \frac{1}{2+8x^2}dx = \frac{\pi}{16}$, find the value of k.

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22. Evaluate: $\int_0^4 \frac{1}{\sqrt{x^2+2x+3}}dx$

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23. (i) $\int_0^1 xe^x dx = 1$

(ii) $\int_0^1 \tan^{-1} x dx = \frac{\pi}{4} - \frac{1}{2}\log 2$

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24. $\int_0^{\pi/4} 2\tan^3 x dx = 1 - \log 2$

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25. $\int_0^1 \sin^{-1} x dx = \frac{\pi}{2} - 1$

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26. If $\int_0^a 3x^2 dx = 8$, find the value of a.

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27. $\int_0^{\pi/4} \tan x dx$

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28. $\int_0^{\frac{\pi}{2}} x^2 \sin x dx$

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29. $\int_0^{\pi/2} x^2 \cos 2x dx$

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30. Evaluate the integrals $\int -11 \frac{dx}{x^2 + 2x + 5}$

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31. (i) $\int_1^2 \frac{dx}{(x+1)(x+2)}$ (ii) $\int_1^2 \frac{x+3}{x(x+2)dx}$

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32. $\int_1^3 \frac{dx}{x^2(1+x)}$

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33. $\int_0^{\pi} \frac{xdx}{a^2\cos^2 x}, (a>1)$

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34. $\int_3^4 \frac{dx}{\sqrt{x^2+4}}$

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35. Evaluate the following :

$$\int_{\pi/2}^{\pi} e^x \left(\frac{1-\sin x}{1-\cos x} \right) dx.$$

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36. $\int_1^2 \left(\frac{1}{x} - \frac{1}{2x^2} \right) e^{2x}$ dx is equal to

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37. $\int_0^1 \frac{1}{\sqrt{x+3} - \sqrt{x+1}} dx$

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38. $\int_0^1 \left(\cos^{-1} x \right)^2 dx.$

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39. Prove that: $\int_0^{\pi/2} \cos^4 x dx = \frac{3\pi}{16}$

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40. If the marginal revenue (MR) function is defined as the rate of change of total revenue (R) with respect to the quantity demanded at an instant. IF the marginal revenue of a function is given by:

$MR = 25e^{-x/400}\left(1 - \frac{x}{100}\right)$

find the total revenue function through integration, putting the condition that R=6 when x=0

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41. IF the marginal cost is defined as the rate of change of total cost with respect to the number of units of the product, The marginal cost of producing x units of a product is given by marginal cost

$= 2x\sqrt{x+5}$. The cost of producing 4 units of the product is Rs 314.40 . Find the cost function.

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42. If (x) is of the form $f(x) = a + bx + cx^2$, show that $\int_0^1 f(x)dx = \frac{1}{6}\left\{f(0) + 4f\left(\frac{1}{2}\right) + f(1)\right\}$

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43. (A) For each of the following function f(x), verify that: $\int_0^2 f(x)dx = \int_0^1 f(x)dx + \int_1^2 f(x)dx$: (i) f(x)=x+2 (ii) f(x)=$x^2 + 2$ (iii) f(x)=e^x (B) For each of the following pairs of function $f(x)$ and $g(x)$, verify that: $\int_0^1 [f(x) + g(x)]dx = \int_0^1 f(x)dx + \int_0^1 g(x)dx$: (i) f(x)=1,g(x) =$x^2$ (ii) $f(x) = e^x, g(x) = 1$

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SUB CHAPTER 7.3 EXERCISE 7(p) FAQ

1. Prove that: $\int_0^{2a} f(x)dx = \int_0^{2a} f(2a-x)dx$.

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2. Using properties of definite integrals, prove the following:

$$\int_0^2 x\sqrt{2-x}dx = \frac{16}{15}\sqrt{2}$$

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

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

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5. $\int_{-2}^{2} \frac{x^2}{1+5^x} dx$

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

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

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8. Evaluate: $\int_0^{\pi} \frac{\cos x}{(1+\sin x)^2} dx$

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9. Evaluate (i) $\int_0^{\pi} \frac{x \sin x}{1+\cos^2 x} dx$

Evaluate (ii) $\int_0^{\pi} \frac{4x \sin x}{1+\cos^2 x} dx$

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10. Evaluate: $\int_0^{2\pi} \frac{1}{1+e^{s \in x}} dx$

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11. $\int_0^{\frac{\pi}{2}} \log(\sin x) dx$

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12. Prove that $\int_0^{\pi/2} \sin 2x \log \tan x dx = 0$

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13. Evaluate: $\int_0^{\pi} \cos 2x \log \sin x dx$

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14. Evaluate: $\int_0^1 \cot^{-1}\left(1 - x + x^2\right) dx$

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15. $\int_{-1}^{1/2} |x \cos(\pi x)| \, dx$

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16. Evaluate: $\int_0^1 |3x - 1| dx$

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17. Evaluate $\int_{-1}^{2} |x^3 - x| dx$

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

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19. Evaluate: $\int_{0}^{2} |x^2 + 2x - 3| dx$

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20. Evaluate: $\int_{0}^{3/2} |x \sin \pi x| dx.$

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21. Evaluate: $\int_{0.5}^{3.5} [x]dx$

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22. Evaluate the following integral: $\int_0^4 (|x| + |x-2| + |x-4|)dx$

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23. Evaluate: $\int_{-2}^{2} f(x)dx$ where

$$f(x) = \begin{cases} 2x-1 & -2 \leq x \leq 1 \\ 3x-2 & 1 \leq x \leq 2 \end{cases}$$

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SUB CHAPTER 7.3 EXERCISE 7(p) SHORT ANSWER QUESTION TYPE

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

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2. $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\sqrt{\tan x}} = \int_0^{\frac{\pi}{2}} \frac{dx}{1+\sqrt{\cot x}} = \frac{\pi}{4}$

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3. Evaluate the following integral: $\int_0^{\pi/2} \frac{1}{1+\tan x} dx$

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4. Evaluate the following integral: $\int_0^{\pi/2} \frac{1}{1+\cot x} dx$

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5. Evaluate the following integral: $\int_0^{\pi/2} \frac{1}{1+\tan^3 x} dx$

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6. $\int_0^{\frac{\pi}{2}} \frac{\sin^{\frac{3}{2}} x}{\sin^{\frac{3}{2}} x + \cos^{\frac{3}{2}} x} dx$

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7. (i) $\int_0^{\pi/2} \frac{\sin^3 x}{\sin^3 x + \cos^3 x} dx$

(ii) $\int_0^{\pi/2} \frac{\cos^3 x}{\sin^3 x + \cos^3 x} dx$

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

(iv) $\int_0^{\pi/2} \frac{\cos^5 x}{\sin^5 x + \cos^5 x} dx$

(v) $\int_0^{\pi/2} \frac{\sin^5 x}{\sin^5 x + \cos^5 x} dx$

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8. (i) $\int_0^a \frac{\sqrt{x}}{\sqrt{x} + \sqrt{a - x}} dx$

(ii) $\int_0^5 \frac{\sqrt{x}}{\sqrt{x} + \sqrt{5 - x}} dx$

(iii) $\int_0^a \frac{dx}{x+\sqrt{a^2+x^2}}$

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9. (i) $\int_0^1 x\sqrt{2-x}dx$

(ii) $\int_0^1 x^2(1-x)^n dx$

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10. Prove that

$$\int_0^1 x(1-x)^5 dx = \frac{1}{42}$$

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11. Prove that $\int_{-a}^a f(x)dx = 0$, where 'f' is an odd function. And, evaluate, $\int_{-1}^1 \log\left[\frac{2-x}{2+x}\right]dx$

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SUB CHAPTER 7.3 EXERCISE 7(p) LONG ANSWER TYPE QUESTIONS (I)

1. $\int_0^{\pi/2} \frac{\cos x}{3\cos x + \sin x} dx$

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

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

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4. Integrate the function $f(x) = \dfrac{\sin x}{1 + \cos^2 x}$

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5. $\displaystyle\int_0^{\pi} \frac{x}{1 + \sin x} dx$

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6. $\displaystyle\int_0^{\pi} \frac{x}{a^2 \cos^2 x + b^2 \sin^2 x} dx$

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7. Evaluate the following integral: $\displaystyle\int_0^1 \frac{\log(1 + x)}{1 + x^2} dx$

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8. $\int_{-\pi/2}^{\pi/2} \left(5\sin^3 x + 8\sin x + 4\cos^2 x\right) dx$

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9. (i) $\int_{-8}^{8} \left(\sin^{93} x + x^{295}\right) dx$

(ii) $\int_{-1}^{1} \sin^5 x \cos^4 x dx$

(iii) $\int_{-\pi/4}^{\pi/4} x^3 \sin^4 x dx$

(iv) $\int_{-1}^{1} x^{17} \cos^4 x dx$

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10. (i) $\int_{0}^{\pi/2} \sin^2 dx = \frac{\pi}{4}$

(ii) $\int_{0}^{\pi/2} \cos^2 x dx = \frac{\pi}{4}$

(iii) $\int_{-\pi/4}^{\pi/4} \sin^2 x dx = \frac{\pi}{4} - \frac{1}{2}$

(iv) $\int_{-\pi/4}^{\pi/4} \cos^2 x dx = \frac{\pi}{4} + \frac{1}{2}$

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11. Evaluate: $\int_0^{2\pi} \cos^5 x \, dx$

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12. $\int_0^{\pi} \frac{x \sin x}{1 + \sin x} dx = \frac{\pi}{2}(\pi - 2)$

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MULTIPLE CHOICE QUESTION

1. The antiderivative of $\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$ equals:

A. $\frac{1}{3}x^{\frac{1}{3}} + 2x^{\frac{1}{2}} + c$

B. $\frac{2}{3}x^{\frac{2}{3}} + \frac{1}{2}x^2 + c$

C. $\frac{2}{3}x^{\frac{3}{2}} + 2x^{\frac{1}{2}} + c$

D. $\frac{3}{2}x^{\frac{3}{2}} + \frac{1}{2}x^{\frac{1}{2}} + c$

Answer: C

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2. If $\frac{d}{dx}[f(x)] = 4x^3 - \frac{3}{x^4}$ solve that $f(2) = 0$ then find f(x)

A. $x^4 + \frac{1}{x^3} - \frac{129}{8}$

B. $x^3 + \frac{1}{x^4} + \frac{129}{8}$

C. $x^4 + \frac{1}{x^3} + \frac{129}{8}$

D. $x^3 + \frac{1}{x^4} - \frac{129}{8}$

Answer: A

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3. $\int \frac{10x^9 + 10x^x (\log)_{e^{10}} dx}{x^{10} + 10^x}$ equals(A) $10^x - x^{10} + C$ (B) $10^x + x^{10} + C$(C) $\left(10^x - x^{10}\right)^{-1} + C$ (D) $\log\left(10^x + x^{10}\right) + C$

A. $10^x - x^{10} + c$

B. $10^x + x^{10} + c$

C. $\left(10^x - x^{10}\right)^{-1} + c$

D. $\log\left(10^x + x^{10}\right) + c$

Answer: D

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4. $\int \frac{dx}{\sin^2 x \cos^2 x}$ equals

A. $\tan x + \cot x + c$

B. $\tan x - \cot x + c$

C. $\tan x + \cot x + c$

D. $\tan x - \cot 2x + c$

Answer: B

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5. $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx$ is equal to:

A. tanx+cotx+c

B. tanx+cosecx+c

C. $-\tan x + \cot x + c$

D. $\tan x + \sec x + c$

Answer: A

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6. $\int \frac{e^x(1+x)}{\cos^2(e^x x)} dx$ equal to

A. $-\cot(xe^x) + c$

B. $\tan(xe^x) + c$

C. $\tan(e^x) + c$

D. $\cot(e^x) + c$

Answer: B

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7. $\int \frac{dx}{x^2+2x+2}$ equals(A) $x\tan^{-1}(x+1)+C$ (B) $\tan^{-1}(x+1)+C$(C) $(x+1)\tan^{-1}x+C$ (D) $\tan^{-1}x+C$

A. $x\tan^{-1}(x+1)+c$

B. $\tan^{-1}(x+1)+c$

C. $(x+1)\tan^{-1}(x+c)$

D. $\tan^{-1} x + c$

Answer: B

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8. $\int \frac{dx}{\sqrt{9x - 4x^2}}$ equals(A) $\frac{1}{9}\sin^{-1}\left(\frac{9x-8}{8}\right) + C$ (B)

$\frac{1}{2}\sin^{-1}\left(\frac{8x-9}{9}\right) + C$(C) $\frac{1}{3}\sin^{-1}\left(\frac{9x-8}{8}\right) + C$ (D)

$\frac{1}{2}\sin^{-1}\left(\frac{9x-8}{9}\right) + C$

A. $\frac{1}{9}\sin^{-1}\left(\frac{9x-8}{8}\right) + c$

B. $\frac{1}{2}\sin^{-1}\left(\frac{8x-9}{9}\right) + c$

C. $\frac{1}{3}\sin^{-1}\left(\frac{9x-8}{8}\right) + c$

D. $\frac{1}{2}\sin^{-1}\left(\frac{9x-8}{9}\right) + c$

Answer: B

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9. $\int \frac{xdx}{(x-1)(x-2)}$ equal(A) $\log\left|\frac{(x-1)^2}{x-2}\right| + C$ (B)

$\log\left|\frac{(x-2)^2}{x-1}\right| + C$(C) $\log\left|\frac{(x-1)^2}{x-2}\right| + C$ (D)

$\log|(x-1)(x-2)| + C$

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

B. $\log\left|\left(\frac{(x-2)^2}{x-1}\right)\right| + C$

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

D. $\log|(x-1)(x-2)| + c$

Answer: B

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10. $\int \frac{dx}{x(x^2+1)}$ equal(A) $\log|x| - \frac{1}{2}\log(x^2+1) + C$ (B)

$\log|x| + \frac{1}{2}\log(x^2+1) + C$(C) $-\log|x| + \frac{1}{2}\log(x^2+1) + C$(D)

$\frac{1}{2}\log|x| + \log(x^2+1) + C$

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

B. $\frac{1}{2}\log|x| + \frac{1}{2}\log\left(x^2+1\right) + c$

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

D. $\log|x| + \log\left(x^2+1\right) + c$

Answer: A

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11. Choose the correct answer $\int x^2 e^x \hat{} \, 3dx$ equals (A) $\frac{1}{3}e^x \hat{} \, 3 + C$ (B) $\frac{1}{3}e^x \hat{} \, 2 + C$ (C) $\frac{1}{2}e^x \hat{} \, 3 + C$ (D) $\frac{1}{2}e^x \hat{} \, 2 + C$

A. $\frac{1}{3}e^{x^3} + c$

B. $\frac{1}{3}e^{x^2} + c$

C. $\frac{1}{2}e^{x^3} + c$

D. $\frac{1}{2}e^{x^2} + c$

Answer: A

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12. $\int e^x \sec x(1+\tan x)dx = ?$

A. $e^x \cos x + c$

B. $e^x \sec x + c$

C. $e^x \sin x + c$

D. $e^x \tan x + c$

Answer: B

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13. Choose the correct answer $\int \sqrt{a+x^2}dx$ is equal to (A) $\frac{x}{2}\sqrt{1+x^2} + \frac{1}{2}\log\left|\left(x+\sqrt{x+x^2}\right)\right| + C$ (B) $\frac{2}{3}\left(1+x^2\right)^{\frac{3}{2}} + C$ (C)

$\frac{2}{3}x\left(1+x^2\right)^{\frac{3}{2}}+C$ (D) $\frac{x^2}{2}\sqrt{1+x^2}+\frac{1}{2}x^2\log\left|x+\sqrt{1+x^2}\right|+C$

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

B. $\frac{2}{3}\left(1+x^2\right)^{\frac{3}{2}}+c$

C. $\frac{2}{3}x\left(1+x^2\right)^{\frac{3}{2}}+c$

D. $\frac{x^2}{2}\sqrt{1+x^2}+\frac{1}{2}x^2\log\left|x+\sqrt{1+x^2}\right|+c$

Answer: A

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14. $\int\sqrt{x^2-8x+7}$ is equal to

A.

$$\frac{1}{2}(x-4)\sqrt{x^2-8x+7}+9\log\left|(x-4)+\sqrt{x^2-8x+7}\right|+c$$

B.

$$\frac{1}{2}(x-4)\sqrt{x^2-8x+7}+9\log\left|(x+4)+\sqrt{x^2-8x+7}\right|+c$$

C.

$$\frac{1}{2}(x-4)\sqrt{x^2-8x+7}-3\sqrt{2}\log\left|(x-4)+\sqrt{x^2-8x+7}\right|+c$$

D.

$$\frac{1}{2}(x-4)\sqrt{x^2-8x+7}-\frac{9}{2}\log\left|(x-4)+\sqrt{x^2-8x+7}\right|+c$$

Answer: D

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15. $\int_1^{\sqrt{3}} \frac{1}{1+x^2}dx$ is equal to $\frac{\pi}{12}$ b. $\frac{\pi}{4}$ c. $\frac{\pi}{6}$ d. $\frac{\pi}{3}$

A. $\frac{\pi}{3}$

B. $\frac{2\pi}{3}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{12}$

Answer: D

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16. $\int_0^{2/3} \frac{dx}{4x + 9x^2}$ equals:

A. $\frac{\pi}{6}$

B. $\frac{\pi}{12}$

C. $\frac{\pi}{24}$

D. $\frac{\pi}{4}$

Answer: C

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17. The value of the integral

$\int_{1/3}^{1} \frac{\left(x - x^3\right)^{1/3}}{x^4} dx$ is

A. 6

B. 0

C. 3

D. 4

Answer: A

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18. If $f(x) = \int_0^x t \sin t dt,$ then f'(x) is

A. $\cos x + x \sin x$

B. x sin x

C. x cos x

D. $\sin x + x \cos x$

Answer: B

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19. The value of $\int_{-\pi/2}^{\pi/2} \left(x^3 + x\cos x + \tan^5 x + 1\right) dx$ is equal to (A) 0(B) 2C) π(D) none of these

A. 0

B. 2

C. π

D. 1

Answer: C

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20. The value of $\int_0^{\pi/2} \log\left(\frac{4+3\sin x}{4+3\cos x}\right) dx$ is:

A. 2

B. $\frac{3}{4}$

C. 0

D. -2

Answer: C

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21. Choose the correct answers $\int \frac{dx}{e^x + e^{-x}}$ is equal to(A) $\tan^{-1}(e^x) + C$ (B) $\tan^{-1}(e^{-x}) + C$ (C) $\log(e^x - e^{-x}) + C$ (D) $\log(e^x + e^{-x}) + C$

A. $\tan^{-1}(e^x) + c$

B. $\tan^{-1}(e^{-x}) + c$

C. $\log(e^x - e^{-x}) + c$

D. $\log(e^x + e^{-x}) + c$

Answer: A

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22. The value of $\int \frac{\cos 2x}{(\sin x + \cos x)^2}$ dx is equal to

A. $\frac{-1}{\sin x + \cos x}$

B. $\log|\sin x + \cos x| + c$

C. $\log|\sin x - \cos x| + c$

D. $\frac{1}{(\sin x + \cos x)^2}$

Answer: B

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23. If $f(a+b-x) = f(x)$, then $\int_a^b x f(x) dx$ is equal to (A) $\frac{a-b}{2}\int_a^b f(a+b-x)dx$ (B) $\frac{a+b}{2}\int_a^b f(b-x)dx$ (C)

$\frac{a+b}{2}\int_a^b f(x)dx$ (D) $\frac{b-a}{2}\int_a^b f(x)dx$

A. $\frac{a+b}{2}\int_a^b f(b-x)dx$

B. $\frac{a+b}{2}\int_a^b f(b+x)dx$

C. $\frac{b-a}{2}\int_a^b f(x)dx$

D. $\frac{a+b}{2}\int_a^b f(x)dx$

Answer: D

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24. $\int e^x(\cos x - \sin x)dx$ is equal to

A. $e^x \cos x + c$

B. $e^x \sin x + c$

C. $-e^x \cos x + c$

D. $-e^x \sin x + c$

Answer: A

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25. $\int \frac{dx}{\sin^2 x \cdot \cos^2 x}$ is equal to

A. $\tan x + \cot x + c$

B. $(\tan x + \cot x)^2 + c$

C. $\tan x - \cot x + c$

D. $(\tan x - \cot x)^2 + c$

Answer: C

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26. $If \int \frac{3e^x - 5e^{-1}}{4e^x + 5e^{-x}} dx = ax + b\ln\left(4e^x + 5e^{-x}\right) + C, then$ $a = -\frac{1}{8}, b = \frac{7}{8}$ (b) $a = \frac{1}{8}, b = \frac{7}{8}$ $a = -\frac{1}{8}, b = -\frac{7}{8}$ (d)

$a = \frac{1}{8}, b = -\frac{7}{8}$

A. $a = -\frac{1}{8}, b = \frac{7}{8}$

B. $a = \frac{1}{8}, b = \frac{7}{8}$

C. $a = \frac{-1}{8}, b = -\frac{7}{8}$

D. $a = \frac{1}{8}, b = -\frac{7}{8}$

Answer: C

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27. $\int \tan^{-1}\sqrt{x}dx$ is equal to:

A. $(x+1)\tan^{-1}\sqrt{x} - \sqrt{x} + c$

B. $x\tan^{-1}\sqrt{x} - \sqrt{x} + c$

C. $\sqrt{x} - x\tan^{-1}\sqrt{x} + c$

D. $\sqrt{x} - (x+1)\tan^{-1}\sqrt{x} + c$

Answer: A

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28. $\int e^x \left(\frac{1-x}{1+x^2} \right)^2 dx$

A. $\frac{e^x}{1+x^2} + c$

B. $-\frac{e^x}{1+x^2} + c$

C. $\frac{e^x}{(1+x^2)^2} + c$

D. $\frac{e^x}{(1+x^2)^2} + c$

Answer: C

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29. $\int_{a+c}^{b+c} f(x)dx$ is equal to:

A. $\int_a^b f(x-c)dx$

B. $\int_a^b f(x+c)dx$

C. $\int_a^b f(x)dx$

D. $\int_{a-b}^{b-c} f(x)dx$

Answer: A

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30. $\int_{-1}^{1} \frac{x^3+|x|+1}{x^2+2|x|+1}dx$ is equal to

A. log 2

B. 2 log 2

C. $\frac{1}{2}\log 2$

D. 4 log 2

Answer: B

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31. $\int_{-2}^{2} |x \cos \pi x| dx$ is equal to:

A. $\frac{8}{\pi}$

B. $\frac{4}{\pi}$

C. $\frac{2}{\pi}$

D. $\frac{1}{\pi}$

Answer: A

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32. if $\int \frac{e^t dt}{1+t} = a$ then $\int e^t \frac{dt}{(1+t)^2} =$

A. $a-1+\frac{e}{2}$

B. $a+1-\frac{e}{2}$

C. $a-1-\frac{e}{2}$

D. $a+1+\frac{e}{2}$

Answer: B

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33. IF $x=\int_0^4 \frac{dt}{\sqrt{1+9t^2}}$ and $\frac{d^2y}{dx^2}$ =ay, then a is equal to:

A. 3

B. 6

C. 9

D. 1

Answer: C

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34. $\int \frac{dx}{\sqrt{9-25x^2}}$

A. $\sin^{-1}\left(\frac{5x}{3}\right)+c$

B. $\frac{1}{5}\sin^{-1}\left(\frac{5x}{3}\right)+c$

C. $\frac{1}{6}\sin^{-1}\left(\frac{3+5x}{3-5x}\right)+c(d)$

D. $\frac{1}{30}\log\left(\frac{3+5x}{3-5x}\right)+c$

Answer: B

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35. $\int_0^{\pi/2} \frac{\sin^{3/2}x}{\sin^{3/2}x+\cos^{3/2}x}dx$

A. $\frac{\pi}{2}$

B. 0

C. 1

D. $\frac{\pi}{4}$

Answer: D

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36. $\int \sin mx dx$ is:

A. m cos mx+c

B. $-m\cos mx + c$

C. $-\frac{1}{m}\cos mx + c$

D. $\frac{1}{m}\cos mx + c$

Answer: C

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37. $\int \tan^2 \quad x \, dx$

A. x-tanx+c

B. tanx+x+c

C. tanx-x+c

D. x tanx+c

Answer: C

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38. $\int e^x \sec x(1+\tan x)dx = ?$

A. $e^x \cos x + c$

B. $e^x \sec x + c$

C. $e^x \sin x + c$

D. $e^x \tan x + c$

Answer: B

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39. $\int \frac{1}{\sin^2 x \cos^2 x} dx$ is equal to:

A. $\tan x + \cot x + c$

B. $\tan x - \cot x + c$

C. $\tan x . \cot x + c$

D. $\tan x - \cot 2x + c$

Answer: B

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40. $\int_{-1}^{1} \sin^5 x \cos^4 x dx$ is :

A. 1

B. -1

C. 0

D. None of these

Answer: C

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41. $\int \frac{e^x(x\log x+1)}{x}dx$ is equal to

A. e^x+c

B. $e^x\log x+c$

C. $\frac{e^x}{x}+c$

D. $\log x+c$

Answer: B

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42. Evaluate: $\int e^x \left(f(x) + f'(x)\right) dx = e^x f(x) + C$

A. $e^x f'(x) + c$

B. $e^x f(x) + c$

C. $-e^x f'(x) + c$

D. $-e^x f(x) + c$

Answer: B

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43. $\int \tan^2 \quad \mathrm{x}\, \mathrm{dx}$

A. tanx-x+c

B. cotx-x+c

C. secx-x+c

D. None of these

Answer: A

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44. $\int_{-\pi}^{\pi} x^3 \cos^3 x dx$ is:

A. 0

B. π

C. $\frac{\pi}{4}$

D. 2π

Answer: A

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45. The value of $\int_0^1 e^{x^2} x dx$ is equal to:

A. $\frac{1}{3}(e-1)$

B. $\frac{1}{2}(e-1)$

C. $\frac{1}{3}(e+1)$

D. $\frac{1}{2}(e+1)$

Answer: B

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46. $\int_0^a f(a-x)\,dx=$

A. $\int_0^{2a} f(x)dx$

B. $\int_{-a}^{a} f(x)dx$

C. $\int_0^a f(x)dx$

D. $\int_a^0 f(x)dx.$

Answer: C

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47. $\int_0^{\pi/2} \frac{\sin^{1/2} x}{\sin^{1/2} x + \cos^{1/2} x} dx$ is equal to

A. 0

B. $\frac{\pi}{2}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{4}$

Answer: D

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48. $\sin 2x$

A. cos 2x

B. $-\cos 2x$

C. $\frac{-\cos 2x}{2}$

D. $2\cos 2x$

Answer: C

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49. The value of $\int \frac{x^2}{1+x^6} dx$ is equal to

A. $\frac{1}{3}\tan^{-1} x^3 + c$

B. $\tan^{-1}\sqrt{x} + c$

C. $\sin^{-1} x^3 + c$

D. None of these

Answer: A

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50. $\int (2x+7)^6 \, dx$ is equal to:

A. $\frac{(2x+7)^7}{14} + c$

B. $\frac{(2x+7)^6}{14} + c$

C. $\frac{(2x+7)^7}{7} + c$

D. $\frac{-(2x+7)^7}{14} + c$

Answer: A

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FILL IN THE BLANKS

1. $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) dx, (x \neq 0)$=___

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2. (i) $\int \cos ecx dx$=____

(ii) $\int \sec x dx = $ ____

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3. $\int \frac{\sin^2 x - \cos^2 x}{\sin x \cos x} dx = $ _____

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4. $\int \frac{x^3 + 5x^2 + 4}{x^2} dx =$

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5. (i) $\int \tan^2 x dx$=____

(ii) $\int \cot^2 x dx = $ _____

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

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7. (i) $\int \sqrt{a^2 - x^2} dx =$ _ _

(ii) $\int \sqrt{x^2 - a^2} dx =$ _____

(iii) $\int \sqrt{a^2 + x^2} dx =$ _ _

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8. $\int (2 - x) \sin x dx$=_____

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9. Given $\int e^x (\tan x + 1)\sec x \, dx = e^x f(x) + c$ write $f(x)$ satisfying the above.

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10. $\int \frac{1}{9x^2 - 1} dx =$

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11. $\int_2^3 3^x dx =$ ___

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12. $\int_0^1 \frac{dx}{\sqrt{1 + x^2}} =$ ____

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13. If $\int_0^1 \left(3x^2 + 2x + k\right) dx = 0,$ find the value of k.

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14. If $f(x) = \int_0^x t \sin t dt,$ then f'(x) is

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15. $\int_0^{1.5} [x] dx =$ _ _ where [x] is greatest integer function.

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TRUE/FALSE QUESTIONS

1. (i) $\int \tan dx = \log|\sec x| + c$

(ii) $\int \cot x dx = \log|\sin x| + c$

(iii) $\int \tan x dx = \log|\sin x| + c$

(iv) $\int \tan x dx = -\log \cos x + c$

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2. Prove that $\int \sec^2 dx = \tan x + c$

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3. (i) $\int \sec x dx = |\log|\tan x| + c$

(ii) $\int \sec dx = \log|\sec x + \tan x| + c$

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4. Prove that $\int \frac{dx}{\sqrt{25-9x^2}} = \frac{1}{3}\sin^{-1}\left(\frac{3x}{5}\right) + c$

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5. $\int \sin\sqrt{x}dx =$

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6. Prove that $\int e^x\left(\tan^{-1}x + \frac{1}{1+x^2}\right)dx = e^x\tan^{-1}x + c$

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7. $\int e^x\left(\frac{1+x\log x}{x}\right)dx = e^x(m\log x) + c$, then m=

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8. Show that $\int \frac{1}{x^2-16}dx = \frac{1}{8}\log\left|\frac{x-4}{x+4}\right| + c$

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9. Prove that $\int_2^3 \frac{x}{x^2+1}dx = \log\sqrt{2}$

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10. Evaluate $\int_0^{\frac{\pi}{2}} \cos^2 x dx$

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VERY SHORT ANSWER TYPE QUESTONS

1. Find $\int \frac{3+3\cos x}{x+\sin x}dx.$

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2. Find $\int(\cos^2 2x - \sin^2 2x)\,dx$

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3. Find $\int xe^{1+x^2}dx.$

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

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5. Integrate $\frac{e^{-\log x}}{x}$

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6. If $\int f(x)dx = \log|\tan x| + c$ find f (x).

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7. Find: $\int \cos ecx(\cos ecx - \cot x)dx$

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

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9. Evaluate : $\int \frac{1}{x + x\log x} dx$

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10. Find $\int \frac{\sin(\log x)}{x} dx$

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11. Find: $\int \sin^2 x dx$

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12. Evaluate: $\int x \sqrt{x^4 + 1}\, dx$

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13. Evaluate: $\int x e^{2x}\, dx$

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14. Integration of $e^x\left(\log x + \frac{1}{x}\right) =$

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15. Evaluate: $\int_{-2}^{2}(x^3 + x)dx$

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16. Evaluate: $\int_{1}^{\sqrt{3}} \frac{1}{1+x^2}dx$

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17. Evaluate: $\int_{-\pi/2}^{\pi/2} \sin^7 x dx$

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18. Evaluate the following integral: $\int_2^4 \frac{x}{x^2+1} dx$

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19. Evaluate: $\int_0^3 \frac{dx}{9+x^2}$

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20. Evaluate each of the following integral: $\int_2^3 \frac{1}{x} dx$

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21. Evaluate: $\int_e^{e^2} \frac{dx}{x \log x}$

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22. $\int_{\pi/4}^{\pi/2} \cot^2 x dx =$

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

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

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25. Evaluate: $\int_0^{\pi} |\cos x| dx$

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EXERCISE 7.1

1. Find an anti derivative (or integral) of the following functions by the method of inspection. sin 2x

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2. Find an anti derivative (or integral) of the following functions by the method of inspection. cos 3x

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3. Find an anti derivative (or integral) of the following functions by the method of inspection. e^{2x}

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4. Find an anti derivative (or integral) of the following functions by the method of inspection.$(ax+b)^2$

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5. $\sin 2x - 4e^{3x}$

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6. $\int (4e^{3x}+1)\,dx$

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7. Find the following integrals :

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

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8. $\int (ax^2 + bx + c)\,dx$

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9. Find the following integrals :

$\int (2x^2 + e^x)\,dx$

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10. Find the following integrals :

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

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11. Find the integral $\int \frac{x^3 + 5x^2 - 4}{x^2} dx$

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12. Evaluate the following integrals.

$$\int \frac{x^3 + 3x^2 + 4}{\sqrt{x}} dx$$

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13. Find the following integrals :

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

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14. Find the following integrals :

$$\int (1 - x)\sqrt{x} dx$$

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15. Find the integral $\int \sqrt{x}\left(3x^2+2x+3\right)dx$

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16. Integrate the functions $\frac{1}{\sqrt{x^2+2x+2}}$

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17. Integrate the functions $\frac{1}{9x^2+6x+5}$

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18. Evaluate: $\int \frac{1}{\sqrt{7-6x-x^2}}\,dx$

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19. Integrate the functions $\frac{1}{\sqrt{(x-a)(x-b)}}$

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20. Evaluate: $\int \frac{1}{\sqrt{8+3x-x^2}}\,dx$

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21. Integrate the functions $\frac{1}{\sqrt{(x-a)(x-b)}}$

Watch Video Solution

22. Integrate the functions $\frac{4x+1}{\sqrt{2x^2+x-3}}$

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

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24. Integrate the functions $\frac{5x-2}{1+2x+3x^2}$

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25. Evaluate : $\int \frac{6x+7}{\sqrt{(x-5)(x-4)}}\,dx$

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26. Evaluate :

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

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27. Evaluate: $\int \frac{x+2}{\sqrt{x^2+2x+3}} dx$

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28. Integrate the functions $\frac{x+3}{x^2-2x-5}$

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29. Integrate the functions $\frac{5x+3}{\sqrt{x^2+4x+10}}$

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EXERCISE 7.5

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

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2. Integrate the rational functions $\frac{1}{x^2-9}$

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

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4. $\frac{x}{(x-1)(x-2)(x-3)}$

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5. Integrate the rational functions $\frac{2x}{x^2+3x+2}$

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6. Integrate $\frac{1-x^2}{x(1-2x)}$

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7. $\frac{x}{(x^2+1)(x-1)}$

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8. $\frac{x}{(x-1)^2(x+2)}$

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

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

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11. Evaluate: $\int \frac{5x}{(x+1)(x^2-4)}\,dx$

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

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13. $\frac{2}{(1-x)(1+x^2)}$

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14. Integrate the rational functions $\frac{3x-1}{(x+2)^2}$

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15. $\frac{1}{x^4-1}$

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16. $\int \frac{1}{x(x^n+1)}$

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

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

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19. Integrate the rational functions $\frac{2x}{(x^2+1)(x^2+3)}$

Watch Video Solution

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

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21. $\frac{1}{(e^x-1)}$

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22. $\int \frac{xdx}{(x-1)(x-2)}$ equals:

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

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

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

D.

Answer: B

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23. $\int \frac{dx}{x(x^2+1)}$ equal(A) $\log|x| - \frac{1}{2}\log(x^2+1) + C$ (B) $\log|x| + \frac{1}{2}\log(x^2+1) + C$(C) $-\log|x| + \frac{1}{2}\log(x^2+1) + C$(D) $\frac{1}{2}\log|x| + \log(x^2+1) + C$

A. $\log|x| - \frac{1}{2}\log(x^2+1) + c$

B. $\log|x| + \frac{1}{2}\log(x^2+1) + c$

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

D.

Answer: A

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EXERCISE 7.6

1. integrate the function $x \sin x$

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2. Evaluate $\int x \sin 3x dx.$

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3. Integrate $x^2 e^x$

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4. Integrate $x \log x$

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5. $x \log 2x$

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6. Integrate the functions$x^2 \log x$

Watch Video Solution

7. Integrate the functions$x \sin^{-1} x$

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8. $\int (x \tan^{-1} x dx)$

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9. Integrate $x \cos^{-1} x$

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10. Integrate the functions $\left(\sin^{-1} x\right)^2$

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11. Evaluate: $\int \frac{x \cos^{-1} x}{\sqrt{1-x^2}} dx$

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12. $\int x \sec^2 x dx$

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13. Integrate $\tan^{-1} x$

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14. Integrate $x(\log x)^2$

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15. Integrate the functions $\left(x^2+1\right)\log x$

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16. Integrate the function $e^x(\sin x+\cos x)$

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17. Evaluate $\int \frac{xe^x}{(1+x)^2}dx$

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18. Integrate the function $e^x\left(\frac{1+\sin x}{1+\cos x}\right)$

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19. Evaluate: $\int e^x \left(\frac{1}{x} - \frac{1}{x^2} \right) dx$

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20. Integrate the functions $\frac{(x-3)e^x}{(x-1)^3}$

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21. Evaluate: $\int e^{2x} \sin x \, dx$

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22. If $x \in [-1, 1] then \frac{\sin^{-1}(2x)}{1+x^2}$ equals

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EXERCISE 7.7

1. Evaluate: $\sqrt{4-x^2}$

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2. Integrate the functions $\sqrt{1-4x^2}$

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3. Integrate the functions $\sqrt{x^2+4x+6}$

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4. Integrate the functions $\sqrt{x^2+4x+1}$

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5. Integrate the functions $\sqrt{1-4x-x^2}$

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6. Integrate the functions $\sqrt{x^2+4x-5}$

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7. Integrate the functions $\sqrt{1+3x-x^2}$

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8. Integrate the functions $\sqrt{x^2+3x}$

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9. Integrate the functions $\sqrt{1+\frac{x^2}{9}}$

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EXERCISE 7.8

1. $\int_m^n x dx$

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2. $\int_0^5 (x+1) dx$

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3. $\int_{-2}^3 x^2 dx$

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4. $\int_1^4 (x^2 - x)\,dx$

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5. $\int_{-1}^1 e^x\,dx$

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

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7. $\int_0^2 x\sqrt{2-x}\,dx$

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8. The value of $\int_0^{\pi/2} (2\log\sin x - \log\sin 2x)dx$, is

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9. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x dx$

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

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11. Evaluate: $\int_{-\pi/2}^{\pi/2} \sin^7 x dx$

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12. Evaluate: $\int_0^{2\pi} \cos^5 x \, dx$

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

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14. Evaluate: $\int_0^{\pi} \log(1 + \cos x) dx$

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15. Evaluate the following :

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

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16. Evaluate the following integral: $\int_0^4 |x-1|dx$

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17. Show that $\int 0af(x)g(x)dx = 2\int 0af(x)dx$ if f and g defined as $f(x) = f(a-x)$ and $g(x) + g(a-x) = 4$

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MISCELLANEOUS EXERCISE ON CHAPTER 7

1. $\frac{1}{x-x^3}$

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2. Integrate the functions $\frac{1}{\sqrt{x+a}+\sqrt{x+b}}$

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3. $\frac{1}{x\sqrt{ax-x^2}}$ [Hint : Put x $= \frac{a}{t}$]

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4. $\int \frac{1}{x^2(x^4+1)^{3/4}} dx =$

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

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6. Evaluate $\int \frac{5x}{(x+1)(x^2+9)} dx$

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7. Integrate the functions $\frac{\sin x}{\sin(x-a)}$

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8. Evaluate: $\int \frac{e^{5\ (\log)_e x} - e^{4\ (\log)_e x}}{e^{3\ (\log)_e x} - e^{2\ (\log)_e x}}\, dx$

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9. $\int \frac{\cos x}{\sqrt{4-\sin^2 x}}\, dx$

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10. $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx$

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11. $\int \frac{1}{\cos(x+a)\cos(x+b)} dx$

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12. $\int \frac{x^3}{\sqrt{1-x^8}} dx$

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

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

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15. $\cos^3 x e^{\log \sin x}$

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16. Evaluate: $\int e^{3\log x}\left(x^4+1\right)^{-1} dx$

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17. Integrate the functions $f'(ax+b)[f(ax+b)]^n$

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18. Integrate the functions $\frac{1}{\sqrt{\sin^3 x \sin(x+\alpha)}}$

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

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

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21. $\frac{2+\sin 2x}{1+\cos 2x}e^x$

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

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23. Integrate the function $\tan^{-1}\sqrt{\frac{1-x}{1+x}}$

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24. Integrate the functions $\frac{\sqrt{x^2+1}\left[\log\left(x^2+1\right)-2\log x\right]}{x^4}$

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25. Evaluate the following :

$$\int_{\pi/2}^{\pi} e^x\left(\frac{1-\sin x}{1-\cos x}\right)dx.$$

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

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

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

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

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

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31. Evaluate:

$$\int_0^{\frac{\pi}{2}} \left(\sin 2x \tan^{-1}(\sin x)\right) dx$$

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32. Evaluate: $\int_0^{\pi} \frac{x \tan x}{sec x + \tan x} dx$

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33. Evaluate $\int_1^4 f(x)dx$, where $f(x) = |x-1| + |x-2| + |x-3|$

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34. $\int_1^3 \frac{dx}{x^2(x+1)} = \frac{2}{3} + \log. \frac{2}{3}$

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35. Evaluate: $\int_0^1 x\, e^x dx$

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36. $\int_{-1}^{1} x^{17} \cos^4 x \, dx$ is equal to

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37. $\int_0^{\pi} \sin 3x dx = \frac{2}{3}$

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38. $\int_0^{\frac{\pi}{4}} 2\tan^3 x dx = 1 - \log 2$

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39. $\int_0^1 \sin^{-1} x dx = \frac{\pi}{2} - 1$

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40. Evaluate $\int 01 e^{2-3x} dx$ as a limit of a sum.

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41. Choose the correct answers $\int \frac{dx}{e^x + e^{-x}}$ is equal to(A) $\tan^{-1}(e^x) + C$ (B) $\tan^{-1}(e^{-x}) + C$ (C) $\log(e^x - e^{-x}) + C$ (D) $\log(e^x + e^{-x}) + C$

A. $\tan^{-1}(e^x) + c$

B. $\tan^{-1}(e^{-x}) + c$

C. $\log(e^x - e^{-x}) + c$

D. $\log(e^x + e^{-x}) + c$

Answer: A

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42. If $f(a+b-x)=f(x)$, then $\int_a^b xf(x)dx$ is equal to (A) $\frac{a-b}{2}\int_a^b f(a+b-x)dx$ (B) $\frac{a+b}{2}\int_a^b f(b-x)dx$ (C) $\frac{a+b}{2}\int_a^b f(x)dx$ (D) $\frac{b-a}{2}\int_a^b f(x)dx$

A. $\frac{a+b}{2}\int_a^b f(b-x)dx$

B. $\frac{a+b}{2}\int_a^b f(b+x)dx$

C. $\frac{b-a}{2}\int_a^b f(x)dx$

D. $\frac{a+b}{2}\int_a^b f(x)dx$

Answer: D

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43. The value of $\int_0^1 \tan^{-1}\left(\frac{2x-1}{1+x-x^2}\right)dx,$ is 1 b. -1 c. 0 d. $\pi/4$

A. 1

B. 0

C. -1

D. $\frac{\pi}{4}$

Answer: B

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QUESTION FROM NCERT EXAMPLAR

1. Verify the following using the concept of integration as an antiderivative.

$$\int \frac{x^3}{x+1}dx = x - \frac{x^2}{2} + \frac{x^3}{3} - \log|x+1| + C$$

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

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3. Evaluate: $\int \tan^8 x \sec^4 x dx$

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4. Evaluate: $\int \frac{x^3+x}{x^4-9} dx$

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5. Evaluate: $\int_0^1 \frac{dx}{e^x + e^{-x}}$

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

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EXERCISE

1. $\int \frac{3ax}{b^2 + c^2x^2} dx$

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2. Evaluate: $\int \frac{x^3}{x^4 + 3x^2 + 2} dx$

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

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

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5. Evaluate: $\int \frac{\sin^{-1} x}{(1-x^2)^{3\backslash 2}} dx$

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6. Evaluate the following integrals:

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

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7. $\int \frac{\sqrt{x}}{\sqrt{a^3 - x^3}} dx$ equal to

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8. $\int_{\pi/3}^{\pi/2} \frac{\sqrt{1+\cos x}}{(1-\cos x)^{5/2}} dx$

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9. Evaluate: $\int_{\pi/4}^{\pi/4} \log(\sin x + \cos x) dx$

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10. Evaluate the following integrals: $\int_0^{\pi/2} \frac{\tan x}{1+m^2 \tan^2 x} dx$

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REVISION EXERCISE

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

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2. $\int \frac{2\sin 2\theta - \cos\theta}{6 - \cos^2\theta - 4\sin\theta} d\theta$

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3. $\int \frac{x^8}{(1+x^3)^{1/3}} dx$

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

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5. $\int e^x \left(\frac{1-x}{1+x^2}\right)^2 dx$

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6. $\int \frac{\tan\theta d\theta}{1-\sin\theta}$

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

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8. $\int \frac{dx}{\sin^3 x \cos^5 x}$

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9. Evaluate: $\int \sqrt{\frac{a+x}{x}}\, dx$

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

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11. $\int_0^{\pi} \frac{\sqrt{1+\cos x}}{(1-\cos x)^{5/2}} dx$

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12. $\int \cos\left(2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right) dx$

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13. Evaluate: $\int \frac{\log x}{(x+1)^2}\, dx$

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14. $\int \frac{\sqrt{\cos x}}{\sin x} dx$

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15. (i) $\int \frac{1}{\cos^4 x + \sin^4 x} dx$

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

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16. $\int \frac{\sin^{-1}\sqrt{x} - \cos^{-1}\sqrt{x}}{\sin^{-1}\sqrt{x} + \cos^{-1}\sqrt{x}}$

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17. Evaluate: $\int \frac{\sqrt{\cos 2x}}{\sin x} dx$

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

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19. $\int_2^5 \left(x^2 + x\right) dx$

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20. $\int_0^2 x\sqrt{2 - x} dx$

Watch Video Solution

21. $\int_0^{2\pi} |\cos x| dx = 4$

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22. $\int_0^{\pi/2} \log(\tan x + \cot x) dx = \pi(\log 2)$

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23. Prove that

$$\int_0^{\pi/2} \frac{\sin x \cos x}{a^2 \sin^2 x + b^2 \cos^2 x} dx = \frac{1}{a^2 - b^2} \log\left(\frac{a}{b}\right).$$

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24. Evaluate: $\int_0^{\pi/2} \sqrt{\cos\theta} \sin^3\theta d\theta h\eta$

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25. $\int_0^{\pi/4} \left(\sqrt{\tan x} + \sqrt{\cot x}\right) dx$ equals

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

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27. Evaluate:

$\int_0^{\frac{\pi}{2}} \left(\sin 2x \tan^{-1}(\sin x)\right) \text{dx}$

Watch Video Solution

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

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CHECK YOUR UNDERSTANDING

1. If $f'(x) = x - \frac{3}{x^2}, f(1) = \frac{11}{2}$, then f(x)=.....

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2. $\int \tan x dx = -\log|\cos x| + c$

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3. $\int \cos ec^2 x dx = -\cot x$

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4. $\int \sqrt{a^2 - x^2} dx =$

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5. Evaluate: $\int e^x \left(\cot x - \operatorname{cosec}^2 x\right) dx$

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6. Which of the following is wrong?

A. $\int \sqrt{x^2 - a^2}\, dx = \frac{x}{2}\sqrt{x^2 - a^2} + \frac{a^2}{2}\log\left|x + \sqrt{x^2 + a^2}\right| + c$

B. $\int \sqrt{x^2 + a^2}\, dx = \frac{x}{2}\sqrt{x^2 + a^2} + \frac{a^2}{2}\log\left|x + \sqrt{x^2 + a^2}\right| + c$

C. $\int \frac{1}{\sqrt{x^2 + a^2}}\, dx = \log\left|x + \sqrt{x^2 + a^2}\right| + c$

D. $\int \frac{1}{\sqrt{x^2 - a^2}}\, dx = \log\left|x + \sqrt{x^2 - a^2}\right| + c$

Answer: A

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7. Evaluate: $\int_0^1 x\, e^x\, dx$

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8. Evaluate $\int_{-1}^{1} |x| dx$

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9. If $(x) = \int_{0}^{x} t \sin t \, dt$, then write the value of $f'(x)$

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10. $\int_{-1}^{1} x^{17} \cos^4 x dx = 0$

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COMPETITION FILE

1. Let $I = \int_0^1 \frac{\sin x}{\sqrt{x}} dx$ and $J = \int_0^1 \frac{\cos x}{\sqrt{x}} dx$. Then which of the following is true?

A. $I > \frac{2}{3}$ and $J < 2$

B. $I > \frac{2}{3}$ and $J > 2$

C. $I < \frac{2}{3}$ and $J < 2$

D. $I < \frac{2}{3}$ and $J > 2$

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2. The value of $\sqrt{2}\int \frac{\sin x}{\sin\left(x - \frac{\pi}{4}\right)} dx$, is

A. $x - \log\left|\cos\left(x - \frac{\pi}{4}\right)\right| + c$

B. $x + \log\left|\cos\left(x - \frac{\pi}{4}\right)\right| + c$

C. $x - \log\left|\sin\left(x - \frac{\pi}{4}\right)\right| + c$

D. $x + \log\left|\sin\left(x - \frac{\pi}{4}\right)\right| + c$

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3. $\int_0^{\pi} [\cot x] dx$, where [.] denotes the greatest integer function, is equal to

A. $\frac{\pi}{2}$

B. 1

C. -1

D. $-\frac{\pi}{2}$

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4. Let $p(x)$ be a function defined on R such that $p'(x) = p'(1-x)$ for all $x\varepsilon[0,1], p(0) = 1,$ and $p(1) = 41.$

Then $\int_0^1 p(x)dx$ is equal to

A. $\sqrt{41}$

B. 21

C. 41

D. 42

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5. The value of $\int_0^1 \frac{8\log(1+x)}{1+x^2}dx$ is:

A. $\pi \log 2$

B. $\frac{\pi}{8}\log 2$

C. $\frac{\pi}{2}\log 2$

D. $\log 2$

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6. For $x\varepsilon\left(0, \frac{5\pi}{2}\right)$, definite $f(x) = \int_0^x \sqrt{t}\sin t dt$. Then f has

A. local maximum at π and 2π

B. local minimum at π and 2π

C. local minimum at π and local maximum at 2π

D. local maximum at π and local minimum at 2π

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7. Let [] denote the greatest integet function then the value $\int_0^{1.5} x\left[x^2\right].\,dx$

A. 0

B. $\frac{3}{2}$

C. $\frac{3}{4}$

D. $\frac{5}{9}$

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8. If the integral $\int \frac{5\tan x}{\tan x - 2}dx = x + a\log|\sin x - 2\cos x| + c,$ then a is equal to

A. -1

B. -2

C. 1

D. 2

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9. If $g(x) = \int_0^x \cos^4 t dt$, then $g(x+\pi)$ equals

A. $\frac{q(x)}{q(\pi)}$

B. $q(x) + q(\pi)$

C. $q(x) - q(\pi)$

D. $q(x).\, q(\pi)$

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10. If $\int f(x)dx = \psi(x)$, then $\int x^5 f(x^3)dx$

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

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

C. $\frac{1}{3}\left[x^3\psi(x^3) - 3\int x^3\psi(x^3)dx\right] + c$

D. $\frac{1}{3}\left[x^3\psi(x^3) - 3\int x^2\psi(x^3)dx\right] + c$

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11. The intercepts on x-axis made by tangents to the curve, $y = \int_0^x |t|dt, x \in R,$ which are parallel to the line $y = 2x$, are equal to (1) ± 2 (2) ± 3 (3) ± 4 (4) ± 1

A. ± 2

B. ± 3

C. ± 4

D. ± 1

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12. The integral $\int\left(1+x-\frac{1}{x}\right)e^{x+\frac{1}{x}}dx$ is equal to

A. $xe^{x+\frac{1}{x}}+c$

B. $(x+1)e^{x+\frac{1}{x}}+c$

C. $-xe^{x+\frac{1}{x}}+c$

D. $(x-1)e^{x+\frac{1}{x}}+c$

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13. The integral $\int_0^{\pi} \sqrt{1+4\sin^2\frac{x}{2}-4\sin\frac{x}{2}}\,dx$ is equal to

A. $\frac{2\pi}{3}-4-4\sqrt{3}$

B. $4\sqrt{3}-4$

C. $4\sqrt{3}-4-\frac{\pi}{3}$

D. $\pi-4$

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14. The integral $\int \frac{dx}{x^2(x^4+1)^{3/4}}$ equals

A. $\left(\frac{x^4+1}{x^4}\right)^{1/4}$

B. $(x^4+1)^{1/4}+c$

C. $-(x^4+1)^{1/4}+c$

D. $-\left(\frac{x^4+1}{x^4}\right)^{1/4}+c$

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15. The integral $\int_2^4 \frac{\log x^2}{\log x^2 + \log(36 - 12x + x^2)dx}$ is equal to: (1) 2 (2) 4 (3) 1 (4) 6

A. 2

B. 4

C. 1

D. 6

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16. The integral $\int \frac{2x^{12} + 5x^9}{(x^5 + x^3 + 1)^3} dx$ is equal to (where C is a constant of integration)

A. $\frac{x^{10}}{2(x^5+x^3+1)^2}+c$

B. $\frac{x^5}{2(x^5+x^3+1)^2}+c$

C. $-\frac{x^{10}}{2(x^5+x^3+1)^2}+c$

D. $-\frac{x^5}{2(x^5+x^3+1)^2}+c$

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17. $\lim_{n\to\infty}\left[\frac{(n+1)(n+2)\ldots 3n}{n^{2n}}\right]^{1/n}$ is equal to

A. $\frac{27}{e^2}$

B. $\frac{9}{e^2}$

C. $3\log 3-2$

D. $\frac{18}{e^4}$

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18. $\int_{\pi/4}^{3\pi/4} \frac{dx}{1+\cos x}$ is equal to

A. 4

B. -1

C. -2

D. 2

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19. Let $I_n = \int \tan^n x dx, (n > 1)$. If $I_4 + I_6 = a\tan^5 x + bx^5 + C$, Where C is a constant of integration, then the ordered pair (a, b) is equal to :

A. $\left(\frac{1}{5}, -1\right)$

B. $\left(-\frac{1}{5}, 0\right)$

C. $\left(-\frac{1}{5}, 1\right)$

D. $\left(\frac{1}{5}, 0\right)$

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20. The integral

$$\int \frac{\sin^2 x \cos^2 x}{\left(\sin^5 x + \cos^3 x \sin^2 x + \sin^3 x \cos^2 x + \cos^5 x\right)^2} dx$$ is equal to

(where c is a constant of integration)

A. $\frac{1}{3\left(1+\tan^3 x\right)} + c$

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

C. $\frac{1}{1+\cot^3 x} + c$

D. $\frac{-1}{1+\cot^3 x} + c$

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21. The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin^2 x}{1+2^x} dx$ is: (A) π (B) $\frac{\pi}{2}$ (C) 4π (D) $\frac{\pi}{4}$

A. $\frac{\pi}{8}$

B. $\frac{\pi}{2}$

C. 4π

D. $\frac{\pi}{4}$

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22. Let f and g be continuous fuctions on [0, a] such that $f(x) = f(a-x)$ and $g(x) + g(a-x) = 4$ then $\int_0^a f(x)g(x)dx$ is equal to

A. $\int_0^a f(x)dx$

B. $4\int_0^a f(x)dx$

C. $-3\int_0^a f(x)dx$

D. $2\int_0^a f(x)dx$

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23. The integral $\int\cos(\log_e x)dx$ is equal to (where C is constant of integration):

A. $x[\cos(\log_e x) - \sin(\log_e x)] + c$

B. $\frac{x}{2}[\cos(\log_e x) + \sin(\log_e x)] + c$

C. $\frac{x}{2}[\sin(\log_e x) + \cos(\log_e x)] + c$

D. $x[\cos(\log_e x) + \sin(\log_e x)] + C$

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24. The integral $\int \sec^{2/3} x \operatorname{cosec}^{4/3} x \, dx$ is equal to (here C is a constant of integration)

A. $3 \tan^{1/3} x + c$

B. $-3 \cot^{1/3} x + c$

C. $-3 \tan^{1/3} x + c$

D. $\frac{3}{4} \cot^{1/3} x + c$

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