Question 1:

sin 2*x*

ANSWER:

The anti derivative of sin 2*x* is a function of *x* whose derivative is sin 2*x*.

It is known that,

$$\frac{d}{dx}(\cos 2x) = -2\sin 2x$$
$$\Rightarrow \sin 2x = -\frac{1}{2}\frac{d}{dx}(\cos 2x)$$
$$\therefore \sin 2x = \frac{d}{dx}\left(-\frac{1}{2}\cos 2x\right)$$

Therefore, the anti derivative of $\sin 2x \text{ is } -\frac{1}{2}\cos 2x$

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Question 2:

Cos 3*x*

ANSWER:

The anti derivative of cos 3*x* is a function of *x* whose derivative is cos 3*x*.

It is known that,

$$\frac{d}{dx}(\sin 3x) = 3\cos 3x$$
$$\Rightarrow \cos 3x = \frac{1}{3}\frac{d}{dx}(\sin 3x)$$
$$\therefore \cos 3x = \frac{d}{dx}\left(\frac{1}{3}\sin 3x\right)$$

Therefore, the anti derivative of $\cos 3x \text{ is } \frac{1}{3}\sin 3x$.

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Question 3:

e^{2x}

ANSWER:

The anti derivative of e^{2x} is the function of x whose derivative is e^{2x}.

It is known that,

$$\frac{d}{dx}\left(e^{2x}\right)=2e^{2x}$$
$$\Rightarrow e^{2x}=\frac{1}{2}\frac{d}{dx}\left(e^{2x}\right)$$
$$\therefore e^{2x}=\frac{d}{dx}\left(\frac{1}{2}e^{2x}\right)$$

Therefore, the anti derivative of e^{2x} is $\frac{1}{2}e^{2x}$.

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Question 4:

$(ax+b)^2$

ANSWER:

The anti derivative of $(ax+b)^2$ is the function of x whose derivative is $(ax+b)^2$.

It is known that,

$$\frac{d}{dx}(ax+b)^3=3a(ax+b)^2$$
$$\Rightarrow (ax+b)^2=\frac{1}{3a}\frac{d}{dx}(ax+b)^3$$
$$\therefore (ax+b)^2=\frac{d}{dx}\left(\frac{1}{3a}(ax+b)^3\right)$$

Therefore, the anti derivative of $(ax+b)^2$ is $\frac{1}{3a}(ax+b)^3$.

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Question 5:

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

ANSWER:

The anti derivative of $\left(\sin 2x - 4e^{3x}\right)$ is the function of *x* whose derivative is $\left(\sin 2x - 4e^{3x}\right)$.

It is known that,

$$\frac{d}{dx}\left(-\frac{1}{2}\cos 2x - \frac{4}{3}e^{3x}\right) = \sin 2x - 4e^{3x}$$

Therefore, the anti derivative of $\left(\sin 2x - 4e^{3x}\right)$ is $\left(-\frac{1}{2}\cos 2x - \frac{4}{3}e^{3x}\right)$.

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Question 6:

$\int\left(4e^{3x} + 1\right)dx$

ANSWER:

$$\int\left(4e^{3x} + 1\right)dx$$

$$= 4\int e^{3x}dx + \int 1dx$$

$$= 4\left(\frac{e^{3x}}{3}\right) + x + \text{C}$$

$$= \frac{4}{3}e^{3x} + x + \text{C}$$

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Question 7:

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

ANSWER:

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

$$= \int\left(x^2-1\right)dx$$
$$= \int x^2 dx - \int 1 dx$$
$$= \frac{x^3}{3} - x + C$$

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Question 8:

$$\int\left(ax^2+bx+c\right)dx$$

ANSWER:

$$\int\left(ax^2+bx+c\right)dx$$

$$= a\int x^2 dx + b\int x dx + c\int 1.dx$$
$$= a\left(\frac{x^3}{3}\right) + b\left(\frac{x^2}{2}\right) + cx + C$$
$$= \frac{ax^3}{3} + \frac{bx^2}{2} + cx + C$$

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Question 9:

$$\int\left(2x^2+e^x\right)dx$$

ANSWER:

$$\int\left(2x^2+e^x\right)dx$$

$= 2\int x^2 dx + \int e^x dx$

$= 2\left(\frac{x^3}{3}\right) + e^x + C$

$= \frac{2}{3}x^3 + e^x + C$

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Question 10:

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

ANSWER:

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

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

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

$= \frac{x^2}{2} + \log|x| - 2x + C$

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Question 11:

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

ANSWER:

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

$$= \int\left(x+5-4x^{-2}\right)dx$$
$$= \int x dx+5\int 1.dx-4\int x^{-2}dx$$
$$= \frac{x^2}{2}+5x-4\left(\frac{x^{-1}}{-1}\right)+C$$
$$= \frac{x^2}{2}+5x+\frac{4}{x}+C$$

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Question 12:

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

ANSWER:

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

$$= \int\left(x^{\frac{5}{2}}+3x^{\frac{1}{2}}+4x^{-\frac{1}{2}}\right)dx$$
$$= \frac{x^{\frac{7}{2}}}{\frac{7}{2}}+\frac{3\left(x^{\frac{3}{2}}\right)}{\frac{3}{2}}+\frac{4\left(x^{\frac{1}{2}}\right)}{\frac{1}{2}}+C$$
$$= \frac{2}{7}x^{\frac{7}{2}}+2x^{\frac{3}{2}}+8x^{\frac{1}{2}}+C$$
$$= \frac{2}{7}x^{\frac{7}{2}}+2x^{\frac{3}{2}}+8\sqrt{x}+C$$

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Question 13:

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

ANSWER:

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

On dividing, we obtain

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

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Question 14:

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

ANSWER:

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

$$= \int \left(\sqrt{x} - x^{\frac{3}{2}}\right) dx$$
$$= \int x^{\frac{1}{2}} dx - \int x^{\frac{3}{2}} dx$$
$$= \frac{x^{\frac{3}{2}}}{\frac{3}{2}} - \frac{x^{\frac{5}{2}}}{\frac{5}{2}} + C$$
$$= \frac{2}{3} x^{\frac{3}{2}} - \frac{2}{5} x^{\frac{5}{2}} + C$$

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Question 15:

$$\int \sqrt{x}\left(3x^2 + 2x + 3\right) dx$$

ANSWER:

$$\int \sqrt{x}\left(3x^2 + 2x + 3\right) dx$$

$$= \int \left(3x^{\frac{5}{2}} + 2x^{\frac{3}{2}} + 3x^{\frac{1}{2}} \right) dx$$
$$= 3\int x^{\frac{5}{2}} dx + 2\int x^{\frac{3}{2}} dx + 3\int x^{\frac{1}{2}} dx$$
$$= 3\left(\frac{x^{\frac{7}{2}}}{\frac{7}{2}} \right) + 2\left(\frac{x^{\frac{5}{2}}}{\frac{5}{2}} \right) + 3\frac{\left(x^{\frac{3}{2}} \right)}{\frac{3}{2}} + C$$
$$= \frac{6}{7} x^{\frac{7}{2}} + \frac{4}{5} x^{\frac{5}{2}} + 2x^{\frac{3}{2}} + C$$

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Question 16:

$$\int \left(2x - 3\cos x + e^x \right) dx$$

ANSWER:

$$\int \left(2x - 3\cos x + e^x \right) dx$$

$$= 2\int x dx - 3\int \cos x dx + \int e^x dx$$
$$= \frac{2x^2}{2} - 3(\sin x) + e^x + C$$
$$= x^2 - 3\sin x + e^x + C$$

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Question 17:

$$\int \left(2x^2 - 3\sin x + 5\sqrt{x} \right) dx$$

ANSWER:

$$\int \left(2x^2 - 3\sin x + 5\sqrt{x} \right) dx$$

$$= 2\int x^2 dx - 3\int \sin x dx + 5\int x^{\frac{1}{2}} dx$$

$$= \frac{2x^3}{3} - 3(-\cos x) + 5\left(\frac{x^{\frac{3}{2}}}{\frac{3}{2}}\right) + C$$

$$= \frac{2}{3}x^3 + 3\cos x + \frac{10}{3}x^{\frac{3}{2}} + C$$

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Question 18:

$$\int \sec x(\sec x + \tan x)dx$$

ANSWER:

$$\int \sec x(\sec x + \tan x)dx$$

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

$$= \int \sec^2 x dx + \int \sec x \tan x dx$$

$$= \tan x + \sec x + C$$

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Question 19:

$$\int \frac{\sec^2 x}{\cos ec^2 x} dx$$

ANSWER:

$$\int \frac{\sec^2 x}{\cos ec^2 x} dx$$

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

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Question 20:

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

ANSWER:

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

$$= \int \left(\frac{2}{\cos^2 x} - \frac{3\sin x}{\cos^2 x} \right) dx$$
$$= \int 2\sec^2 x dx - 3\int \tan x \sec x dx$$
$$= 2\tan x - 3\sec x + C$$

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Question 21:

The anti derivative 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:

$$\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)dx$$
$$=\int x^{\frac{1}{2}}dx+\int x^{-\frac{1}{2}}dx$$
$$=\frac{x^{\frac{3}{2}}}{\frac{3}{2}}+\frac{x^{\frac{1}{2}}}{\frac{1}{2}}+C$$
$$=\frac{2}{3}x^{\frac{3}{2}}+2x^{\frac{1}{2}}+C$$

Hence, the correct answer is C.

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Question 22:

If $\frac{d}{dx}f(x)=4x^3-\frac{3}{x^4}$ such that *f*(2) = 0, then *f*(*x*) is

(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:

It is given that,

$$\frac{d}{dx}f(x)=4x^3-\frac{3}{x^4}$$

∴Anti derivative of $4x^3-\frac{3}{x^4}=f(x)$

$$\therefore f(x) = \int 4x^3 - \frac{3}{x^4}\,dx$$

$$f(x) = 4\int x^3\,dx - 3\int \left(x^{-4}\right)dx$$

$$f(x) = 4\left(\frac{x^4}{4}\right) - 3\left(\frac{x^{-3}}{-3}\right) + C$$

$$\therefore f(x) = x^4 + \frac{1}{x^3} + C$$

Also,

$$f(2) = 0$$

$$\therefore f(2) = (2)^4 + \frac{1}{(2)^3} + C = 0$$

$$\Rightarrow 16 + \frac{1}{8} + C = 0$$

$$\Rightarrow C = -\left(16 + \frac{1}{8}\right)$$

$$\Rightarrow C = \frac{-129}{8}$$

$$\therefore f(x) = x^4 + \frac{1}{x^3} - \frac{129}{8}$$

Hence, the correct answer is A.

Page No 304:

Question 1:

$$\frac{2x}{1+x^2}$$

ANSWER:

Let $1 + x^2 = t$

$\therefore 2x\,dx = dt$

$$\Rightarrow \int \frac{2x}{1+x^2}\,dx = \int \frac{1}{t}\,dt$$

$$= \log|t| + C$$
$$= \log\left|1+x^2\right| + C$$
$$= \log\left(1+x^2\right) + C$$

Page No 304:

Question 2:

$$\frac{(\log x)^2}{x}$$

ANSWER:

Let log |*x*| = *t*

$$\therefore \frac{1}{x}\,dx = dt$$

$$\Rightarrow \int \frac{(\log|x|)^2}{x}\,dx = \int t^2\,dt$$
$$= \frac{t^3}{3} + C$$
$$= \frac{(\log|x|)^3}{3} + C$$

Page No 304:

Question 3:

$$\frac{1}{x + x\log x}$$

ANSWER:

$$\frac{1}{x + x\log x} = \frac{1}{x(1+\log x)}$$

Let 1 + log x = t

$\therefore \frac{1}{x}dx = dt$

$$\Rightarrow \int \frac{1}{x(1+\log x)}dx = \int \frac{1}{t}\,dt$$

$$= \log|t| + C$$
$$= \log|1+\log x| + C$$

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Question 4:

sin x · sin (cos x)

ANSWER:

sin x · sin (cos x)

Let cos x = t

∴ −sin x dx = dt

$$\Rightarrow \int \sin x \cdot \sin(\cos x)\,dx = -\int \sin t\,dt$$
$$= -[-\cos t] + C$$
$$= \cos t + C$$
$$= \cos(\cos x) + C$$

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Question 5:

$\sin(ax+b)\cos(ax+b)$

ANSWER:

$$\sin(ax+b)\cos(ax+b) = \frac{2\sin(ax+b)\cos(ax+b)}{2} = \frac{\sin 2(ax+b)}{2}$$

Let $2(ax+b)=t$

∴ $2adx = dt$

$$\Rightarrow \int \frac{\sin 2(ax+b)}{2}dx = \frac{1}{2}\int \frac{\sin t \ dt}{2a}$$
$$= \frac{1}{4a}[-\cos t]+C$$
$$= \frac{-1}{4a}\cos 2(ax+b)+C$$

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Question 6:

$\sqrt{ax+b}$

ANSWER:

Let $ax + b = t$

$\Rightarrow adx = dt$

$$\therefore dx = \frac{1}{a}dt$$

$$\Rightarrow \int (ax+b)^{\frac{1}{2}} dx = \frac{1}{a}\int t^{\frac{1}{2}} dt$$

$$= \frac{1}{a}\left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}}\right)+C$$
$$= \frac{2}{3a}(ax+b)^{\frac{3}{2}}+C$$

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Question 7:

$x\sqrt{x+2}$

ANSWER:

Let $(x+2)=t$

$\therefore dx = dt$

$$\Rightarrow \int x\sqrt{x+2}\,dx = \int (t-2)\sqrt{t}\,dt$$
$$= \int \left(t^{\frac{3}{2}} - 2t^{\frac{1}{2}}\right) dt$$
$$= \int t^{\frac{3}{2}} dt - 2\int t^{\frac{1}{2}} dt$$
$$= \frac{t^{\frac{5}{2}}}{\frac{5}{2}} - 2\left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}}\right) + \text{C}$$
$$= \frac{2}{5}t^{\frac{5}{2}} - \frac{4}{3}t^{\frac{3}{2}} + \text{C}$$
$$= \frac{2}{5}(x+2)^{\frac{5}{2}} - \frac{4}{3}(x+2)^{\frac{3}{2}} + \text{C}$$

Page No 304:

Question 8:

$x\sqrt{1+2x^2}$

ANSWER:

Let $1 + 2x^2 = t$

$\therefore 4x\,dx = dt$

$$\Rightarrow \int x\sqrt{1+2x^2}\,dx = \int \frac{\sqrt{t}\,dt}{4}$$
$$= \frac{1}{4}\int t^{\frac{1}{2}}\,dt$$
$$= \frac{1}{4}\left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}}\right) + C$$
$$= \frac{1}{6}\left(1+2x^2\right)^{\frac{3}{2}} + C$$

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Question 9:

$(4x+2)\sqrt{x^2+x+1}$

ANSWER:

Let $x^2+x+1=t$

∴ $(2x + 1)dx = dt$

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

$$= \int 2\sqrt{t}\;dt$$
$$= 2\int \sqrt{t}\;dt$$
$$= 2\left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}}\right) + C$$
$$= \frac{4}{3}\left(x^2+x+1\right)^{\frac{3}{2}} + C$$

Page No 304:

Question 10:

$$\frac{1}{x-\sqrt{x}}$$

ANSWER:

$$\frac{1}{x-\sqrt{x}}=\frac{1}{\sqrt{x}\left(\sqrt{x}-1\right)}$$

Let $\left(\sqrt{x}-1\right)=t$

$\therefore \frac{1}{2\sqrt{x}}dx=dt$

$$\Rightarrow \int\frac{1}{\sqrt{x}\left(\sqrt{x}-1\right)}dx=\int\frac{2}{t}dt$$

$$=2\log|t|+C$$
$$=2\log\left|\sqrt{x}-1\right|+C$$

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Question 11:

$$\frac{x}{\sqrt{x+4}},x>0$$

ANSWER:

Let I=∫x(x+4) dxput x+4=t⇒dx=dtNow, I=∫(t−4)t√dt=∫(t√−4t−1/2)dt=23t3/2−4(2t1/2)+C=23.t.t 1/2−8t1/2+C=23(x+4)x+4−−−−−√−8x+4−−−−−√+C=23xx+4−−−−−√+83x+4−−−−−√−8x +4−−−−−√+C=23xx+4−−−−−√−163x+4−−−−−√+C=23(x+4−−−−−√)(x−8)+CLet I=∫xx+ 4 dxput x+4=t⇒dx=dtNow, I=∫t-4tdt=∫t-4t-1/2dt=23t3/2-42t1/2+C=23.t.t1/2-8t1/2+C=23x+4x+4-8x+4+C=23xx+4+83x+4-8x+4+C=23xx+4-163x+4+C=23x+4x-8+C

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Question 12:

$$\left(x^3-1\right)^{\frac{1}{3}}x^5$$

ANSWER:

Let $x^3 - 1 = t$

$\therefore\ 3x^2 dx = dt$

$$\Rightarrow \int \left(x^3-1\right)^{\frac{1}{3}} x^5 dx = \int \left(x^3-1\right)^{\frac{1}{3}} x^3 \cdot x^2 dx$$
$$= \int t^{\frac{1}{3}} (t+1) \frac{dt}{3}$$
$$= \frac{1}{3} \int \left(t^{\frac{4}{3}} + t^{\frac{1}{3}} \right) dt$$
$$= \frac{1}{3} \left[\frac{t^{\frac{7}{3}}}{\frac{7}{3}} + \frac{t^{\frac{4}{3}}}{\frac{4}{3}} \right] + C$$
$$= \frac{1}{3} \left[\frac{3}{7} t^{\frac{7}{3}} + \frac{3}{4} t^{\frac{4}{3}} \right] + C$$
$$= \frac{1}{7} \left(x^3-1\right)^{\frac{7}{3}} + \frac{1}{4} \left(x^3-1\right)^{\frac{4}{3}} + C$$

Page No 304:

Question 13:

$$\frac{x^2}{\left(2+3x^3\right)^3}$$

ANSWER:

Let $2 + 3x^3 = t$

$\therefore\ 9x^2\ dx = dt$

$$\Rightarrow \int \frac{x^2}{\left(2+3x^3\right)^3} dx = \frac{1}{9}\int \frac{dt}{(t)^3}$$

$$= \frac{1}{9}\left[\frac{t^{-2}}{-2}\right] + C$$

$$= \frac{-1}{18}\left(\frac{1}{t^2}\right) + C$$

$$= \frac{-1}{18\left(2+3x^3\right)^2} + C$$

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Question 14:

$$\frac{1}{x(\log x)^m}\ ,\ x > 0$$

ANSWER:

Let log x = t

$\therefore \frac{1}{x}dx = dt$

$$\Rightarrow \int \frac{1}{x(\log x)^m} dx = \int \frac{dt}{(t)^m}$$

$$= \left(\frac{t^{-m+1}}{1-m}\right) + C$$

$$= \frac{(\log x)^{1-m}}{(1-m)} + C$$

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Question 15:

$$\frac{x}{9-4x^2}$$

ANSWER:

Let $9-4x^2=t$

∴ $-8x\,dx = dt$

$$\Rightarrow \int \frac{x}{9-4x^2}dx = \frac{-1}{8}\int \frac{1}{t}dt$$
$$= \frac{-1}{8}\log|t| + C$$
$$= \frac{-1}{8}\log\left|9-4x^2\right| + C$$

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Question 16:

e^{2x+3}

ANSWER:

Let $2x+3=t$

∴ $2dx = dt$

$$\Rightarrow \int e^{2x+3}dx = \frac{1}{2}\int e^t dt$$
$$= \frac{1}{2}\left(e^t\right) + C$$
$$= \frac{1}{2}e^{(2x+3)} + C$$

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Question 17:

$\frac{x}{e^{x^2}}$

ANSWER:

Let $x^2=t$

∴ $2xdx = dt$

$$\Rightarrow \int \frac{x}{e^{x^2}} dx = \frac{1}{2} \int \frac{1}{e^t} dt$$

$$= \frac{1}{2} \int e^{-t} dt$$
$$= \frac{1}{2}\left(\frac{e^{-t}}{-1}\right) + C$$
$$= -\frac{1}{2} e^{-x^2} + C$$
$$= \frac{-1}{2e^{x^2}} + C$$

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Question 18:

$$\frac{e^{\tan^{-1} x}}{1 + x^2}$$

ANSWER:

Let $\tan^{-1} x = t$

$\therefore \frac{1}{1 + x^2} dx = dt$

$$\Rightarrow \int \frac{e^{\tan^{-1} x}}{1 + x^2} dx = \int e^t dt$$

$$= e^t + C$$
$$= e^{\tan^{-1} x} + C$$

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Question 19:

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

ANSWER:

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

Dividing numerator and denominator by e^x, we obtain

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

Let $e^x+e^{-x}=t$

$\therefore \left(e^x-e^{-x}\right)dx=dt$

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

$$=\int\frac{dt}{t}$$
$$=\log|t|+C$$
$$=\log\left|e^x+e^{-x}\right|+C$$

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Question 20:

$$\frac{e^{2x}-e^{-2x}}{e^{2x}+e^{-2x}}$$

ANSWER:

Let $e^{2x}+e^{-2x}=t$

$\therefore \left(2e^{2x}-2e^{-2x}\right)dx=dt$

$$\Rightarrow 2\left(e^{2x}-e^{-2x}\right)dx = dt$$

$$\begin{aligned}\Rightarrow \int\left(\frac{e^{2x}-e^{-2x}}{e^{2x}+e^{-2x}}\right)dx &= \int\frac{dt}{2t}\\ &= \frac{1}{2}\int\frac{1}{t}dt\\ &= \frac{1}{2}\log\left|t\right|+\mathrm{C}\\ &= \frac{1}{2}\log\left|e^{2x}+e^{-2x}\right|+\mathrm{C}\end{aligned}$$