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Find the following integrals in Exercises 6 to 20:

6.

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

Solution:

We get,

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

On further calculation, we obtain,

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

Therefore,

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

7.

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

Solution:

We get,

$$=\int\left(x^2-1\right)dx$$

On further calculation, we obtain,

$$=\int x^2dx-\int 1dx$$

Hence,

$$=\frac{x^3}{3}-x+\mathrm{C}$$

8.

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

Solution:

By taking the terms separately, we get,

$$= a\int x^2 dx + b\int x dx + c\int 1.dx$$

On further calculation, we obtain,

$$= a\left(\frac{x^3}{3}\right) + b\left(\frac{x^2}{2}\right) + cx + \mathrm{C}$$

So, we get,

$$= \frac{ax^3}{3} + \frac{bx^2}{2} + cx + \mathrm{C}$$

9.

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

Solution:

By taking the terms separately, we get,

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

On further calculation, we get,

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

Therefore,

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

10.

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

Solution: