# Exercise 7.1

#### **Question 1:**

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

#### Answer 1:

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

### **Question 2:**

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

 $\cos 2x$ 

 $\sin 2x$  is

#### Answer 2:

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

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  $\cos 3x$  is  $\frac{1}{3}\sin 3x$ 

## Chapter - 7 Integrals

### **Question 3:**

Find an anti-derivative (or integral) of the following functions by the method of inspection.  $e^{2\kappa}$ 

#### Answer 3:

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

It is known that,

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

Therefore, the anti-derivative of

### **Question 4:**

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

### Answer 4:

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  $\frac{1}{3a}(ax+b)^3$ 

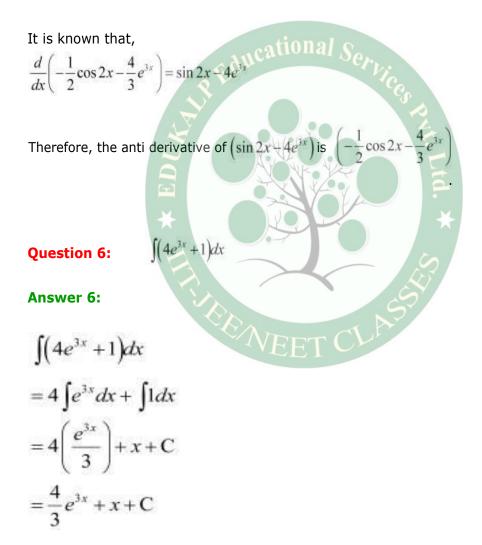
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#### **Question 5:**

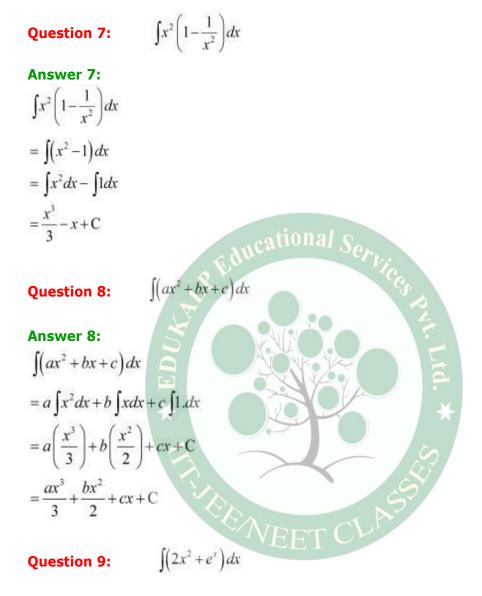
Find an anti-derivative (or integral) of the following functions by the method of inspection.  $\sin 2x - 4e^{3x}$ 

#### Answer 5:

The anti-derivative of sin 2x –  $4e^{3x}$  is the function of x whose derivative is sin2x –  $4e^{3x}$ 

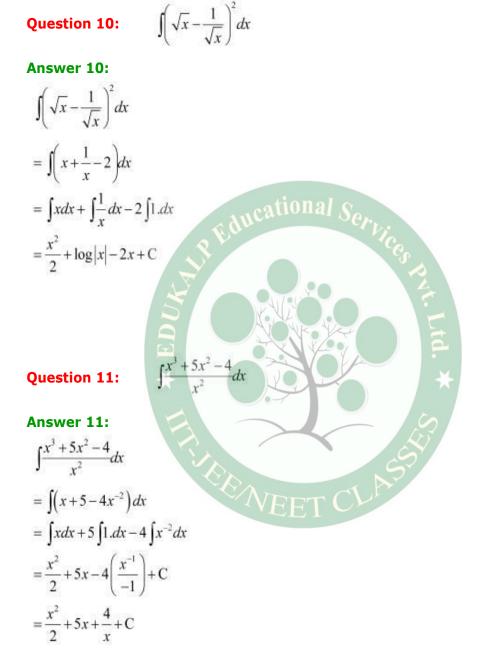


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#### Answer 9:

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



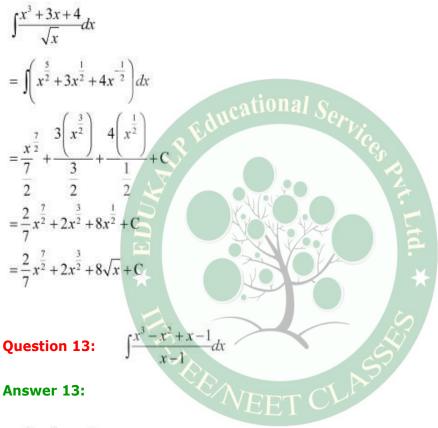
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Question 12:

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

Answer 12:



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

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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