

EXERCISE 22.7

Question. 1

Solution:

From the question it is given that,

$$(x - 1)dy/dx = 2xy$$

By cross multiplication,

$$(1/y) dy = (2x/(x - 1)) dx$$

Integrating on both side, we get,

$$\int (1/y) dy = \int (2x/(x - 1)) dx$$

$$\int (1/y) dy = \int [2 + (2/(x - 1))] dx$$

$$\text{Log } y = 2x + 2 \log [x - 1] + c$$

Question. 2

Solution:

From the question it is given that,

$$(1 + x^2)dy = xy dx$$

By cross multiplication,

$$(1/y) dy = x/(x^2 + 1) dx$$

Integrating on both side, we get,

$$\int (1/y) dy = \int x/(x^2 + 1) dx$$

$$\int (1/y) dy = \frac{1}{2} \int 2x/(x^2 + 1) dx$$

$$\text{Log } y = \frac{1}{2} \log [x^2 + 1] + \log c$$

$$\text{Log } y = \log [C\sqrt{x^2 + 1}]$$

$$y = C\sqrt{x^2 + 1}$$

Therefore, $y = C\sqrt{x^2 + 1}$ is the required solution.

Question. 3

Solution:

From the question it is given that,

$$dy/dx = (e^x + 1)y$$

Integrating on both side, we get,

$$\int (1/y) dy = \int (e^x + 1) dx$$

$$\text{Log } y = e^x + x + c$$

Question. 4

Solution:

From the question it is given that,

$$(x - 1)dy/dx = 2x^3y$$

By cross multiplication,

$$(1/y) dy = (2x^3/(x - 1)) dx$$

$$dy/y = 2[x^2 + x + 1 + (1/(x - 1))]dx$$

Integrating on both side, we get,

$$\int (1/y) dy = \int 2[x^2 + x + 1 + (1/(x - 1))]dx$$

$$\log y = 2[(x^3/3) + (x^2/2) + x + \log (x - 1)] + c$$

$$\log y = (2/3)x^3 + x^2 + 2x + 2 \log (x - 1) + c$$

Question. 5

Solution:

From the question it is given that,

$$xy (y + 1)dy = (x^2 + 1) dx$$

By cross multiplication,

$$y (y + 1)dy = ((x^2 + 1)/x) dx$$

$$(y^2 + y)dy = (x + (1/x)) dx$$

Integrating on both side, we get,

$$\int (y^2 + y)dy = \int (x + (1/x)) dx$$

$$(y^3/3) + (y^2/2) = (x^2/2) + \log x + c$$