
8 The variables x and y satisfy the differential equation

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

where k is a constant. It is given that $y = 0$ when $x = 0$ and that $y = -\frac{1}{2}$ when $x = 1$.

Solve the differential equation and find the exact value of y when $x = \sqrt{3}$. [8]

Handwriting practice sheet with 20 rows of dotted lines for tracing and writing.

[illegible]

[3]

[illegible]

(b) The variables x and y satisfy the differential equation

$$\frac{dy}{dx} = \frac{x^3 + 5x^2 - 2x - 15}{6y(x^2 - 3)}.$$

It is given that $y = 2$ when $x = 2$.

[5]

[illegible]

[illegible]

8 The variables x and θ satisfy the differential equation

$$\sin 2\theta \frac{dx}{d\theta} = (4x + 3) \cos 2\theta,$$

and $x = 0$ when $\theta = \frac{1}{12}\pi$.

Solve the differential equation and obtain an expression for x in terms of θ .

[7]

Handwriting practice lines (dotted lines) for the letter '5'.

[illegible]