Practice Examples

1 Form the differential equation satisfied by $y = ae^{x} + be^{3x}$, where *a* and *b* are arbitrary constants.

2 Form the differential equation satisfied by $y = ae^{-2x} + be^{-x}$, where *a* and *b* are arbitrary constants.

3 Show that $y = x^2 + 1$ is a particular solution of the differential equation $\frac{dy}{dx} = 2x$.

4 Show that $y = A\cos 2x + B\sin 2x$ is the general solution of the differential equation $y'' + 4y = 0$, where *A* and *B* are arbitrary constants.

5 Solve the differential equation $\frac{dy}{dx} = (2x-1)(y+1)$, *given that* $y(0) = 0$.

6 Solve the differential equation $\frac{dx}{dy} = x + y^3$. (P.W)

7 Solve the differential equation $\cos y dy + (\sin y - (x+1)^2)dx = 0$.

8 Solve the differential equation $\frac{dy}{dx} = \frac{x^2 + y^2 + 1}{2xy}$.

9 Solve the differential equation $(x^3y^2 + xy)dx = dy$.

10 Solve the differential equation $(1+xy)ydx + (1-xy)xdy = 0$.

11 Solve the differential equation $(y\log y)dx + (x - \log y)dy = 0$.