



QUESTION WORKBOOK

First order equations and integrating factors

Differential equations · Year FM

6 questions · 23 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** For an equation in the form $dy/dx + P(x)y = Q(x)$, write down the integrating factor and state what multiplying by it achieves. [2]

- A2** Write down the integrating factor for $dy/dx + y \tan x = \cos x$, simplifying it as far as possible. [2]

SECTION B · Standard

- B1** Solve $dy/dx + y/x = 6x$ for $x > 0$, given that $y = 3$ when $x = 1$. [5]

B2 Find the general solution of $\frac{dy}{dx} - 2y = e^{5x}$. [4]

B3 Solve $\frac{dy}{dx} + 2xy = 4x$, and describe the behaviour of every solution as x grows. [4]

SECTION C · Stretch

C1 Solve $\frac{dy}{dx} - 2y/x = x^2 \ln x$ for $x > 0$, given that $y = 0$ when $x = 1$. [6]