

Advanced Higher Maths
SQA 2018 Paper
Question 15



(a) Use integration by parts to find $\int x \sin 3x \, dx$.

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(b) Hence find the particular solution of

$$\frac{dy}{dx} - \frac{2}{x}y = x^3 \sin 3x, \quad x \neq 0$$

given that $x = \pi$ when $y = 0$.

Express your answer in the form $y = f(x)$.

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Answers:

(a) $-\frac{x}{3} \cos 3x + \frac{1}{9} \sin 3x + c$

(b) $y = -\frac{x^3}{3} \cos 3x + \frac{x^2}{9} \sin 3x - \frac{\pi x^2}{3}$