Railway Engineering Mathematics
Tutorial Sheet 16

Evaluate the following integrals using integration by substitution:

1. $\displaystyle \int \sqrt{1+2x}\,\mathrm{d}x$

2. $\displaystyle \int \frac{4}{4x-1}\,\mathrm{d}x$

3. $\displaystyle \int_0^3 \frac{10x-3}{5x^2-3x+2}\,\mathrm{d}x$

4. $\displaystyle \int_{-\pi}^{\pi/3} 2\sin\left(5t+7\right)\,\mathrm{d}t$

5. $\displaystyle \int (16x-7)(8x^2-7x+5)^3\,\mathrm{d}x$

6. $\displaystyle \int (6t^2+8)(t^3+4t-7)^5\,\mathrm{d}t$

7. $\displaystyle \int_{-2}^4 6(7x-9)^3\,\mathrm{d}x$

8. $\displaystyle \int_{1.7}^{3.9} t\,\mathrm{e}^{-0.6t^2}\,\mathrm{d}t$

9. $\displaystyle\int (2x - 5)^7 \, \mathrm{d}x$

10. $\displaystyle\int \frac{4}{5x - 3} \, \mathrm{d}x$

11. $\displaystyle\int_0^{\pi/6} 24 \sin^5(\theta) \cos(\theta) \, \mathrm{d}\theta$

12. $\displaystyle\int_0^1 3x \, \mathrm{e}^{2x^2 - 1} \, \mathrm{d}x$