

1. Find  $\int \frac{x^2 + 2x}{3\sqrt{x}} dx$ . 4
2. Evaluate  $\int_1^2 \left(x^2 + \frac{1}{x}\right)^2 dx$ . 5
3. (a) Find  $\int \frac{dx}{(3x+2)^3}$ ,  $x \neq -\frac{2}{3}$ . 3
- (b) Find  $\int 2\cos(3+4x) + \frac{3}{x^2} dx$  3
4. The function  $f$ , defined on a suitable domain, is such that  $f'(x) = \frac{1}{4\sqrt{x}}$ .  
If  $f(3) = 5$ , find  $f(x)$  in terms of  $x$ . 5
5. Find the exact value of  $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} (\sin x + \cos(2x)) dx$ . 4
6. Find the values of  $p$  such that  $\int_0^2 \frac{1}{(3x+p)^2} dx = -\frac{1}{4}$ . 7

31 Marks
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