

Question 2 (12 marks) Use the Question 2 Writing Booklet.

- (a) Differentiate $\frac{\cos x}{x}$ with respect to x . **2**
- (b) Solve the inequality $x^2 - x - 12 < 0$. **2**
- (c) Find the gradient of the tangent to the curve $y = \ln(3x)$ at the point where $x = 2$. **2**
- (d) (i) Find $\int \sqrt{5x + 1} dx$. **2**
- (ii) Find $\int \frac{x}{4 + x^2} dx$. **2**
- (e) Given that $\int_0^6 (x + k) dx = 30$, and k is a constant, find the value of k . **2**