

Year 4 Math Assignment 22: Integration

Integration by substitution

1. Using the given substitution or otherwise, integrate

(a) $\int \frac{x}{(2x-1)^4} dx, \quad u = 2x-1$

(b) $\int \frac{\sqrt{x}-1}{\sqrt{x}+1} dx, \quad u = \sqrt{x}$

(c) $\int x^2 \sin(x^3) dx, \quad u = x^3$

(d) $\int \frac{1}{x \ln(x^2)} dx, \quad u = \ln(x^2)$

(e) $\int e^{1+x+e^x} dx, \quad u = e^x$

(f) $\int (\sin^{-1} x)^2 dx, \quad u = \sin^{-1} x$

Integration by parts

2. Integrate

(a) $\int (x^2 + x + 1)e^x dx$

(b) $\int x^3 \ln x dx$

(c) $\int x \sin \frac{x}{2} dx$

(d) $\int \ln(x+1) dx$

(e) $\int e^{-x} \cos x dx$

(f) $\int e^{2x} \cos 3x dx$

(g) $\int \sin(\ln x) dx$

(h) $\int x(\ln x)^2 dx$