

## Extension 1 Integration Worksheet

1.

Show that  $\int_{-a}^a \sqrt{\frac{a-x}{a+x}} dx = \pi a$

2.

Evaluate:  $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$  and show that its value is  $\pi^2/4$

3. Verify that the value of the following integral is zero:

$$\int_{-\pi/2}^{\pi/2} \sin^5 x dx$$

4.

Evaluate  $\int_1^3 (3x^2 + 2x) dx$ .

5. Evaluate  $\int_1^2 (x+2) dx$ .

6. Use the substitution  $u = 25 - x^2$  to evaluate  $\int_3^4 2x/\sqrt{25-x^2} dx$

7. Find the volume of the solid of revolution formed when the region bounded by the curve  $y = 1$ , the x-axis, the y-axis and the line  $x = 3$ , is rotated about the x-axis.

8. Show that:  $\int \frac{\log x}{x} dx = \frac{(\log x)^2}{2} + c$

9. Using integration, show that the area of the following region bounded by ellipse is  $6\pi$  square units:

$$\left\{ (x, y) : \frac{x^2}{9} + \frac{y^2}{4} \leq 1 \leq \frac{x}{3} + \frac{y}{2} \right\}$$