8. Find $\frac{d}{dx}\left(\ln\left(\frac{2+x}{2-x}\right)\right)$ and hence $\int \frac{1}{4-x^2}dx$

9. Find $\frac{d}{dx}\ln(cosx)$ and hence $\int_0^{\frac{\pi}{3}} tanx\, dx$

- **AREA AND VOLUME**

1.

a) Write down the formula for the area bounded between the curve y = f(x) and lines x = a and x = b

b) Write down the formula for the area bounded between the curve $x = g(y)$ and lines $y = c$ and $y = d$

c) Write down the area bounded between the 2 curves $y = f(x) and\ y = g(x)$ if the curves intersect at $x = a$ and $x = b$

d) Write down the formula for the volume generated when the area under the curve $y = f(x)$ between $x = a$ and $x = b$ is revolved about the x $axis$.

e) Write down the formula for the volume generated when the area between the curve $y = f(x)$ and the y $axis$ is revolved about the y $axis$.

2. For the following questions write down how you would evaluate the areas of the regions without performing the integration. However, a sketch is required.

a) Find the area of the region bounded by the curve
$f(x) = x^2 - 9x + 14$, the x axis and the ordinates $x = 3$ and $x = 6$

b) Find the area of the region bounded by the curve
$f(x) = x^2 - 6x$ the x axis and the ordinates $x = 2$ and $x = 8$

c) Find the area of the region bounded by the x axis, the curve
$f(x) = (2x+1)^2$ the line $y = 8x$ given that their point of intersection is $(\frac{1}{2}, 4)$

d) Find the points where the line $y = 3x - 4$ intersects the parabola
$y = x^2 - 3x - 4$ and find the exact area bounded by the line and the parabola.

e) Find the area enclosed by the arc of the curve $x = y^2 - y$ and the y axis.

f) Find the area enclosed between the curve $y = \sqrt{x}$, the y axis and the line $y = 4$

g) Find the area of the region bounded by the curve $y = x^3$ the line $y = 8$ and the y axis
(do this in 2 different ways)

h) Write down an expression for the area bounded by the x $axis$ and the curve
$y = x^2 - x - 2 = 0$ between $0 \leq x \leq 4$.