= Year 12 **= Calculus II** **= Worksheet 3**

1. Find $\int \frac{2}{3\sqrt{2-x^2}}dx$.

2. Find $\int -\frac{1}{\sqrt{2x-x^2}}dx$.

3. Evaluate $\int_{1/3}^{1}\left(\frac{2}{1+3t^2}\right)dt$.

4. Find $\int \frac{1}{2x^2+2x+1}dx$.

5. Evaluate $\int_{-1}^{-2}\left(\frac{2}{x}\right)dx$.

6. Find $\int\left(\frac{1-x}{1+x}\right)dx$

7. Find $\frac{d}{dx}\left(\tan^{-1}\frac{1}{1+x^2}\right)$. Hence find $\int\left(\frac{x^5+2x^3}{x^4+2x^2+2}\right)dx$.

8. Evaluate $\int_{3}^{4}\left(\frac{x^2-4x+3}{x^3-6x^2+12x-8}\right)dx$ in exact form.

9. Find $\int\left(\frac{x^3+x}{x^4+2x^2+4}\right)dx$.

10. Find $\int\left(\frac{\sec^2 x}{\tan x}\right)dx$.

11. Evaluate $\int_{e}^{e^2}\left(\frac{1}{x\log_e x}\right)dx$.

Numerical, algebraic and worded answers.

1. $2/3\ \sin^{-1}(x/\sqrt{2}) + c$
2. $\cos^{-1}(1-x) + c$
3. $\pi/(3\sqrt{3})$
4. $\tan^{-1}(2x+1) + c$
5. $\log_e 4$
6. $\log_e(1+x)^2 - x + c$
7. $-2x / (x^4+2x^2+2)$
   $x^2/2 + \tan^{-1}[1/(1+x^2)] + c$
8. $\log_e 2 - 3/8$
9. $\frac{1}{4}\log_e(x^4+2x^2+4) + c$
10. $\log_e|\tan x| + c$
11. $\log_e 2$