= Year 12 **= Calculus II** **= Worksheet 4**

1. Find $\int\left(x\sqrt{1-x^2}\right)dx$.	2. Anti-differentiate $\sin^2(2x)\cos^3(2x)$.
3. Given $f'(x)=\dfrac{x}{\sqrt{1-x^2}}$, find $f(x)$.	4. Given $g(x)=\sec^4\left(\dfrac{x}{2}\right)\tan^2\left(\dfrac{x}{2}\right)$, find $\int g(x)dx$.
5. Find $\int\left(\dfrac{x^2}{\sqrt{1-x}}\right)dx$.	6. Anti-differentiate $\sin(2x)\sqrt{1-\sin(x)}$.
7. Find $\int\cot(kx)dx$.	8. Evaluate $\int_0^{2\pi}\sqrt{1-\cos(x)}dx$.
9. Given $f'(x)=\cos^2(nx)$, find $f(x)$.	10. Find $\int\sin^4(x)dx$.
11. Evaluate $\int_0^{\pi}\sin^2\left(\dfrac{x}{2}\right)\cos^2\left(\dfrac{x}{2}\right)dx$.	Numerical, algebraic and worded answers. 1. $-(1-x^2)^{3/2}/3 + c$ 2. $\sin^3(2x)/6 - \sin^5(2x)/10 + c$ 3. $-\sqrt{(1-x^2)} + c$ 4. $2\tan^3(x/2)/3 + 2\tan^5(x/2)/5 + c$ 5. $-2\sqrt{(1-x)} + 4(1-x)^{3/2}/3$ $-2(1-x)^{5/2}/5 + c$ 6. $4(1-\sin x)^{5/2}/5 - 4(1-\sin x)^{3/2}/3 + c$ 7. $\log_e\lvert\sin(kx)\rvert / k + c$ 8. $4\sqrt{2}$ 9. $x/2 + \sin(2nx)/(4n) + c$ 10. $3x/8 - \sin(2x)/4 + \sin(4x)/32 + c$ 11. $\pi/8$