= Year 12 **= Calculus II** **= Worksheet 1**

1. Find $\frac{d}{dx}\left(\sec^2\left(x^2\right)\right)$.	2. Given $f(t)=\cos ec^2\left(\sqrt{2t+1}\right)$, find $f'(t)$.
3. Find the derivative of $\cot^2\left(x^2+1\right)$ with respect to x.	4. Is $\frac{d}{dx}\left(\tan^2 x\right)=\frac{d}{dx}\left(\sec^2 x\right)$? Why?
5. Find $\frac{d}{dx}\left(\sin^{-1}\left(x^2\right)\right)$.	6. Given $f(t)=\left[\cos^{-1}\left(\frac{1}{t^2}\right)\right]^2$, find $f'(t)$.
7. Find the derivative of $2ar\tan^2\left(\frac{1}{\sqrt{x}}\right)$ with respect to x.	8. Find the coordinates of the point of inflection in the graph of $y=5\tan^{-1}(5x+1)-1$.
9. Find the x-coordinate of the point(s) of inflection in the graph of $y=x^2e^{-x}$.	10. Find the turning point(s) and/or point(s) of inflection in the graph of $y=\frac{10}{x^2+x+2}$.
11. Given $y=\int\frac{-2}{4+x^{-2}}dx$, find $\frac{dy}{dx}$.	Numerical, algebraic and worded answers.

1. $4x\tan(x^2)\sec^2(x^2)$
2. $-2\cot(\sqrt{(2t+1)})\cos ec^2(\sqrt{(2t+1)})/\sqrt{(2t+1)}$
3. $-4x\cot(x^2+1)\cos ec^2(x^2+1)$
4. Yes, $\tan^2 x$ and $\sec^2 x$ differ by a constant.
5. $2x/\sqrt{(1-x^4)}$
6. $4\cos^{-1}(1/t^2)/[t\sqrt{(t^4-1)}]$
7. $-2\tan(1/\sqrt{x})/[(1+x)\sqrt{x}]$
8. $(-1/5, -1)$
9. $2-\sqrt{2}, 2+\sqrt{2}$
10. T.P.$(-1/2, 40/7)$
    I.P. $(-(3+\sqrt{21})/6, 30/7)$
    $(-(3-\sqrt{21})/6, 30/7)$
11. $-2/(4+x^{-2})$