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Maths Exam Answer Sheet:

a)

(i) $y = \frac{x^2}{2x+1}$

$u = x^2 \quad u' = 2x$
 $v = 2x+1 \quad v' = 2$

$$y' = \frac{u'v - v'u}{v^2} = \frac{[2x(2x+1)] - [2(x^2)]}{(4x^2+2x) - (2x^2)}$$
$$\frac{2x^2+2x}{4}$$

$$= \frac{2x^2+2x}{4} = \frac{1}{2}(x^2+x)$$

(ii) $y = \sqrt{x^2+1}$

$y = [x^2+1]^{\frac{1}{2}}$

$\frac{d}{dx}(\sqrt{x^2+1}) = \frac{x}{\sqrt{x^2+1}}$

$\frac{dy}{dx} = \frac{u^{\frac{1}{2}}}{2} = \frac{1}{2} u^{-\frac{1}{2}}$
let $u = x^2+1$

$y' = \frac{u'v + v'u}{v^2} = \frac{1}{2} x^2+1^{-\frac{1}{2}}$

That's quotient rule $\times$

(iii) $y = (x + \sin 2x)$
 $\rightarrow v' = \cos 2x$
 $u' = 1$

$y' = 2 \cos 2x$