Quiz 2

Name: key

1. Evaluate the integral:

[5] a) $\int_{-1/2}^{1/2} \frac{1}{\sqrt{1-x^2}}\,dx$ $= \left[\arcsin x\right]_{-\frac{1}{2}}^{1/2}$ (2) $= \arcsin\left(\frac{1}{2}\right) - \arcsin\left(\frac{-1}{2}\right)$ (1)

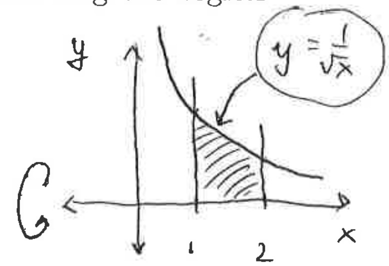
$= \frac{\pi}{6} - \left(\frac{-\pi}{6}\right) = \frac{\pi}{6} + \frac{\pi}{6} = \frac{\pi}{3}$ (2)

[7] b) $\int \frac{x^3}{1+x^8}\,dx$ $= \frac{1}{4}\int \frac{du}{1+u^2}$ (2) $= \frac{1}{4}\arctan u$ (2)

(1) $\boxed{u = x^4}$
(1) $\boxed{du = 4x^3\,dx}$

$= \frac{1}{4}\arctan\left(x^4\right) + C$ (1)

[8] **2.** The shaded region in the diagram lies between the graph of $\frac{1}{\sqrt{x}}$, the x-axis, and the lines $x = 1$ and $x = 2$. Find the volume of the solid obtained by revolving the region around the x-axis.



$V = \int_1^2 \pi y^2\,dx$ (2)

$= \pi \int_1^2 \left(\frac{1}{\sqrt{x}}\right)^2 dx$ (1)

$= \pi \int_1^2 \frac{1}{x}\,dx$ (1) $= \pi\left[\ln x\right]_1^2$ (2) $= \pi(\ln 2 - \ln 1)$ (1)

$= \boxed{\pi \ln 2}$ (1)