Name: Richard | QUIZ 12 | MATH 200, SECTION 9
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1. Use the fundamental theorem of calculus to find the definite integrals.

(a) $\displaystyle\int_{-\pi/2}^{\pi/2} \cos(x)\,dx = \Big[\sin(x)\Big]_{-\pi/2}^{\pi/2} = \sin\left(\frac{\pi}{2}\right) - \sin\left(-\frac{\pi}{2}\right)$

$= 1 - (-1) = \boxed{2}$

(b) $\displaystyle\int_{0}^{1} (1+x^2)\,dx = \left[x + \frac{x^3}{3}\right]_0^1 = \left(1 + \frac{1^3}{3}\right) - \left(0 + \frac{0^3}{3}\right) = \boxed{\frac{4}{3}}$

(c) $\displaystyle\int_{-1}^{1} \frac{1}{\sqrt{1-x^2}}\,dx = \Big[\sin^{-1}(x)\Big]_{-1}^{1} = \sin^{-1}(1) - \sin^{-1}(-1)$

$= \frac{\pi}{2} - \left(-\frac{\pi}{2}\right) = \boxed{\pi}$

2. Find $\displaystyle\int \frac{4x}{2x^2+3}\,dx = \int \frac{1}{2x^2+3}\,4x\,dx = \int \frac{1}{u}\,du$

Let $u = 2x^2 + 3$
So $\frac{du}{dx} = 4x$
And $du = 4x\,dx$

$= \ln|u| + C$

$= \boxed{\ln|2x^2+3| + C}$