Refer to Section 5.4 of the Maple User Manual or Maple help.

1. Evaluate each of the following antiderivatives. Are the answers correct? Explain. If Maple does not give an answer, either rewrite the expression so that Maple can find the answer or find the answer without using Maple.

   (a) $\int \cos^2(x)\sin^3(x)\,dx$

   (b) $\int \frac{3x^2-4x+1}{\sqrt{4x^3-8x^2+4x-3}}\,dx$

   (c) $\int f(x)\,dx$ where $f(x) = \frac{d}{dx}\left[4x\sqrt{\tan 3x}\right]$

   (d) $\int \sin\theta\sqrt[3]{\cos^2(\theta)}\,d\theta$

   (e) $\frac{d}{dt}[w(t)]$ where $w(t) = \int \frac{t\sqrt{\sin t}}{\tan(3t+1)}\,dt$

2. Evaluate each definite integral. Give the exact answer if possible. If not, approximate to five places.

   (a) $\int_{-2}^{3} \left|x^4 - x^3 - 22x^2 + 41x + 1\right|\,dx$

   (b) $\int_{-\frac{\pi}{12}}^{\frac{\pi}{16}} \frac{\cos\left(4x+\frac{\pi}{2}\right)}{\sin^3\left(4x+\frac{\pi}{2}\right)}\,dx$

   (c) $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sec^2 x}{\sqrt[3]{\tan^4 x}}\,dx$

   (d) $\int_{-2}^{1} f(x)\,dx$ where $f(x) = \frac{d}{dx}\left[\frac{3x^3+4x-1}{4x^4+3x^2+2}\right]$

3. Given that the acceleration of a certain particle in a linear tube is given by $a(t) = 4t\cos(3t)$ and the initial velocity is 4 meters per second, find the velocity of the particle at 5 seconds. State the answer in a sentence with appropriate units.

   Note: The command *unapply* can be used to change an expression into a function (see Maple Help *unapply*).