

AMAT 219 MAPLE

ASSIGNMENT W 2006

Due by April 13

Assignments must be stapled and have a cover sheet. Questions marked with a * will require some written explanation as well as the computer work.

- Find π to 459 digits, using the command *evalf*.
 - * Determine the 459th digit of π (the 1st is 3, 2nd 1, 3rd 4, etc.)
- Use the *int* command to find
 - $\int x^3 \ln(x) dx$,
 - $\int \frac{1}{1+x^6} dx$,
 - $\int (\tan(x))^{1/3} dx$.
- A cable is suspended between two towers of equal height h , placed at $x = -50$, $x = 50$ (metres). The equation of the cable is $y = a \cosh(x/a)$, and the cable dips 10 m at the middle.
 - * Derive the equation $a \cosh(50/a) - a - 10 = 0$.
 - Find a , using the *fsolve* command. [Ans. $a = 126.6324360$]
- The position of a particle in space at any time t (in seconds) is given by
$$\mathbf{r}(t) = \langle t^{3/2}, 2t^{5/2}, t^2 \rangle$$
(in metres).
 - Find the speed v at any time t (you can use the command *diff* for this).
 - Find the time $t \geq 0$ for which $v = 300m/s$ (use *fsolve*). [Ans. $t = 15.27108986$ sec]
- Use the *plot3d* command to plot the surface

$$z = \frac{(x^7 + y^8)^{1/3}}{1 + x^2 + y^2}, \quad -1 \leq x, y \leq 1.$$