Power series and iterative solution of equations

Issue date: Tuesday 14th October 2008
Submission is by Tuesday 28th October, 1pm, in the Coursework Box at the George Begg.

1. The Taylor series expansion of $\sin(x)$ around $x = 0$ is

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots .$$

Write a VBA function

```
Function fsin(x, n)
    ...
End Function
```

Plot the curves of `fsin(x,15)` and `fsin(x,20)` for x running from 0 to 15. Comment on the differences between the two curves.

2. Write a VBA function

```
Function f(n)
    ...
End Function
```

to calculate

$$f_n = \sum_{k=0}^{n} \frac{(-1)^k}{2k+1} .$$

Very that

$$\lim_{n \to \infty} f_n = \frac{\pi}{4} .$$