Marks  This will be a closed book exam. No notes will be permitted.

15 1. Define and discuss the following concepts:
   (a) Truncation error
   (b) Rounding error
   For each type of error, specify a method that could be used to reduce that
type of error. What effect, if any, would this method have on the other
type of error?

15 2. Evaluate \( I = \int_0^1 \frac{\cos(x)}{x^{4/5}} \, dx \) with an error less than 0.005.
   
   \( \text{Hint:} \) Replace \( \cos(x) \) by a general Taylor polynomial approximation plus
   its remainder.

3. Use Taylor polynomials to evaluate the following limits:

7  (a) \( \lim_{x \to 0} \frac{e^{x^2} - \cos(x)}{x^2} \)

7  (b) \( \lim_{t \to 0} \frac{(1 + t^2)^{10} - 10 t \sin(t) - 1}{t^4} \)

6  4. Give an algorithm to evaluate \( p(x) = \sum_{k=0}^{8} (k + 2)x^k \) as efficiently as possible
   for \( x = 0.1 \). How many multiplications are necessary?