

Solutions

2.1 The truncated polynomial is $1+0.1+0.1^2/2=1.105$.

2.2 Add the squared terms: $1+4+9+16+25=55$.

2.3 The second derivative of e^x at zero is 1; divide by $2!=2$ to get $1/2$.

2.4 False. The factorial belongs in the denominator of every Taylor coefficient. The expansion centre is not always zero. An approximation close to its centre can be poor far away.

2.5 A A polynomial formed from a function's derivatives at a chosen centre.

3.1 Approximation 1.22; $0 < R < e^{0.2}(0.2)^3/6 \approx 0.001629$. The quadratic underestimates and the exact value lies between 1.22 and 1.221629. The bound depends on the stated Taylor theorem conditions.