

Solutions

2.1 $x_1 = 1.5 - (1.5^2 - 2)/(2 \times 1.5) = 17/12 \approx 1.416667$.

2.2 $h=1$ with heights 0,1,4 gives $(1/2)(0+2 \times 1+4)=3$.

2.3 The exact integral is $[x^3/3]$ from 0 to 2 $= 8/3$.

2.4 False. A sign change across a discontinuity does not prove a root. Iteration can diverge or cycle. The trapezium rule's overestimate or underestimate depends on curvature, not just whether the function increases.

2.5 A A repeated update in which each new approximation is calculated from the previous one.

3.1 $x_1 = 0 - 2/(-2) = 1$; $x_2 = 1 - 1/1 = 0$. It cycles 0, 1 rather than converging. Newton requires suitable starting values/derivatives; use a bracketed method or inspect the function rather than assuming every iteration converges.