Indian Institute of Technology Kharagpur
Department of Mathematics
MA11004 - Linear Algebra, Numeircal and Complex Analysis
Problem Sheet - Answers/Hints- 5
Spring 2021

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1. **Hint:** $\Delta \log f(x) = \log f(x+h) - \log f(x)$

2. **Hint:** Use the basic error formula of interpolation.

3. **Ans:** $x^3 + x^2 - 3x + 1$

4. **Ans:** 48
   Hint: Use Newton's forward interpolation formula

5. **Ans:** 96.6352 thousands
   Hint: Use Newton's backward interpolation formula

6. **Ans:** $f(5) = 32.9333$
   Hint: Use Lagrange's interpolation formula for five nodal points.

7. **Ans:** $\frac{5}{2(x-1)} - \frac{15}{(x-2)} + \frac{31}{2(x-3)}$
   Hint: Take $f(x) = 3x^2 + x + 1$ and use Lagrange's interpolation formula for $f(x)$.

8. **Hints:** Use Lagrange's formula for the arguments -3, -1, 1, 3 and then put $x = 0$.

9. **Ans:** 4.07152

10. **Ans:** 9855 feet
    Hint: Use trapezoidal formula for $n = 14$.

11. **Ans:** $h \leq 0.0047$
    Hint: Error, $E = -\frac{(b-a)h^2}{12} f''(\zeta)$, $\zeta \in (a, b)$

12. **Hint:** Actual area$= \int_{-h}^{h} y \, \mathrm{d}x$

13. **Ans:** 1.8278472