1. Find the average rate of change of:

   (i) $f(x) = 3x^2 - 4$ on $[1, 4]$

   (ii) $g(x) = 2^x - 1$ on $[0, 3]$

   (iii) $h(x) = \sqrt{x^2 - 3x + 6}$ on $[-1, 5]$

   (iv) $k(x) = \dfrac{-2x^2 + x + 3}{3x^2 - 2x + 6}$ on $[-4, -1]$

2. Tables of values for different functions are given below. For each function, find the first order of difference which is zero and determine whether the function is linear, quadratic, or cubic. Show your work.
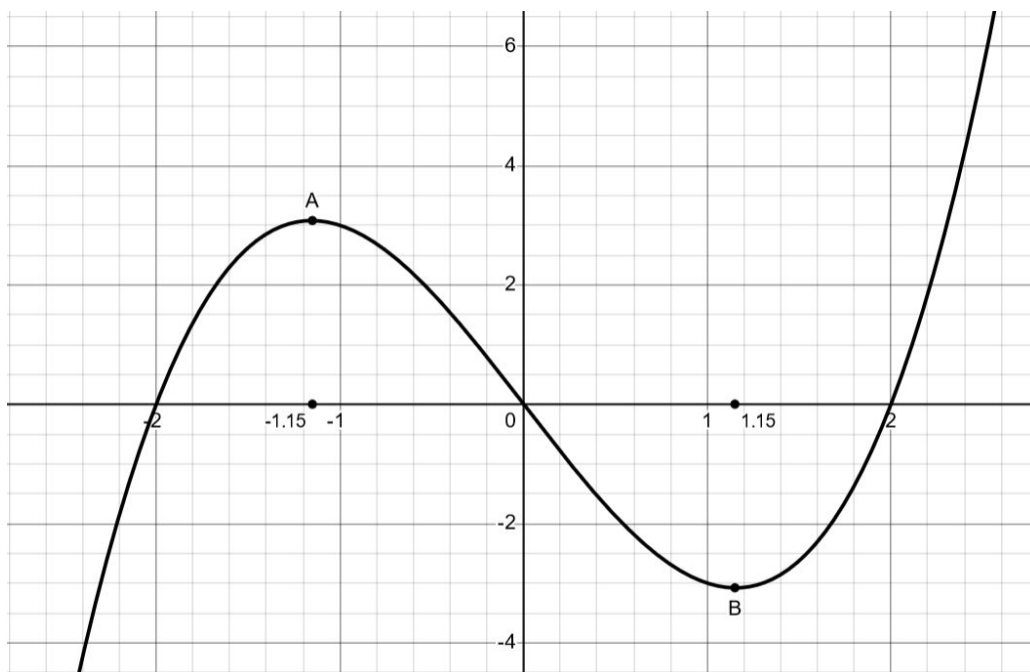
   (i)

   | $x$ | $-2$ | $-1$ | $0$ | $1$ | $2$ | $3$ |
   |---|---|---|---|---|---|---|
   | $f(x)$ | 23 | 8 | 1 | 2 | 11 | 28 |

   (ii)

   | $x$ | $-2$ | $0$ | $2$ | $4$ | $6$ | $8$ |
   |---|---|---|---|---|---|---|
   | $g(x)$ | $-13$ | $-7$ | $-1$ | 5 | 11 | 17 |

   (iii)

   | $x$ | $-3$ | $-2$ | $-1$ | $0$ | $1$ | $2$ |
   |---|---|---|---|---|---|---|
   | $h(x)$ | $-9$ | 6 | 9 | 6 | 3 | 6 |

   (iv)

   | $x$ | $-3$ | $-1$ | $1$ | $3$ | $5$ | $7$ |
   |---|---|---|---|---|---|---|
   | $p(x)$ | 23 | 7 | $-1$ | $-1$ | 7 | 23 |

3. The graph of function $f$ is given above.

   (i) State the intervals where $\dfrac{\Delta f}{\Delta x}$ is positive

   (ii) State the intervals where $\dfrac{\Delta f}{\Delta x}$ is negative

   (iii) State the intervals where $\dfrac{\Delta^2 f}{\Delta x^2}$ is positive

   (iv) State the intervals where $\dfrac{\Delta^2 f}{\Delta x^2}$ is negative

   (v) State the intervals where $\dfrac{\Delta f}{\Delta x}$ is increasing

   (vi) State the intervals where $\dfrac{\Delta f}{\Delta x}$ is decreasing

   (vii) State the intervals where $f$ is increasing at an increasing rate

   (viii) State the intervals where $f$ is increasing at a decreasing rate

   (ix) State the intervals where $f$ is decreasing at an increasing rate

   (x) State the intervals where $f$ is decreasing at an decreasing rate

   (xi) At which point(s) would the graph of $\dfrac{\Delta f}{\Delta x}$ intersect the x-axis?

   (xii) At which point(s) would the graph of $\dfrac{\Delta^2 f}{\Delta x^2}$ intersect the x-axis?