1. The graph of a function $P(x)$ passes through the points $(2\ , -1), (-1, 11), (-2, 27)$ and $(1,\ 3)$.
   (a) Find a Cubic polynomial $P(x) = ax^3 + bx^2 + cx + d$ whose graph passes through these points using **matrices**. **Hint:** Setup a Systems of Equations for each of the ordered pairs and then solve for the unknowns.
   (b) Graph $P(x)\ versus\ x$. Show the equation of the **trend-line** (Cubic Polynomial) on the graph.

2. Carpet City wants to develop a means to forecast its carpet sales. The store manager believes that the store's sales are directly related to the number of new housing starts in town. The manager has gathered data from county records on monthly house construction permits and from store records on monthly sales. These data are as follows:

Carpet Sales (000 yd.)	5	10	4	3	8	2	12	11	9	14
Permits	21	35	10	12	16	9	41	15	18	26

   Develop a linear regression model using **Data Analysis (Regression)** for these data and forecast carpet sales if 30 construction permits for new homes are filled.

3. The surface roughness of coated interior pipes (in micrometers) used in oil fields is as follows: 1.72, 2.50, 2.16, 2.13, 1.06, 2.24, 2.31, 2.03, 1.09, 1.40, 2.57, 2.64, 1.26, 2.05, 1.19, 2.13, 1.27, 1.51, 2.41, 1.95.
   (a) Find the sample mean and the sample standard deviation.
   (b) Construct a 95% confidence interval for the population mean by using the following equations: $B_L = \bar{x} - t\ \frac{s}{\sqrt{N_{sample}}}$ and $B_U = \bar{x} + t\ \frac{s}{\sqrt{N_{sample}}}$.

4. The equation $K = (F - 32) * \frac{5}{9} + 273.15$ coverts the temperature from °F (Fahrenheit) to K (Kelvin) and vice versa. Create a macro to convert temperature from K to °F. Name the macro **KTOF** (Keyboard shortcut: Ctrl + k). Use KTOF to convert 233.15, 273.15, 288.70, and 310.93 to°F. **Your solution should clearly show the macro.**

5. Compound interest is given as $A = P\ (1 + i)^n$ where A is the amount (future value) at the end of n periods, P is the principal (present value), i is the interest rate per compounding period, and n is the number of compounding periods.

   A newborn child receives a $20,000 gift toward college from her grandparents. If the money is invested at 7% compounded quarterly, write a VBA function (Name it **FVAL**) to find the future value in 17 years by using the **equation given above**.

   Create a second VBA function (Name it **TINT**) to find the total interest that will be paid over 17 years.

   Use FVAL and TINT to find the future value and the total interest for 19 years, 21 years, 23 years, and 25 years. **Your solution should clearly show the functions**.