1. Write a function `F2C.m` that accepts temperature in degrees F and computes the corresponding value in degrees C. The relation between two is

\[ T \_ C = \frac{5}{9} (T \_ F - 32) \]

2. Write a function that will calculate volume and surface area of a cylinder for given radius and height. Your function should work for array inputs as well.

3. Write a function named `poly` that receives the coefficients of a third order polynomial \( p(x) \) and a value for \( x \) and returns the result.

   Example: \( \text{poly}(2,-3,0,-2,6) = 2\times6^3-3\times6^2+0\times6-2 = 322 \) (the value function will return)

4. Perhaps the most famous equation in physics is

\[ E=mc^2 \]

which relates energy \( E \) to mass \( m \). The speed of light in a vacuum, \( c \), is the property that links the two together. The speed of light in a vacuum is \( 2.9979 \times 10^8 \) m/s.

   (a) Create a function called `energy` to find the energy corresponding to a given mass in kilograms. Your result will be in joules, since \( 1 \text{ kg m}^2 / \text{s}^2 = 1 \text{ J} \).

   (b) Use your function to find the energy corresponding to masses from 1 kg to \( 10^6 \) kg. Use the `logspace` function (consult help `logspace`) to create an appropriate mass vector.

   (c) Create a plot of your results. Try using different logarithmic plotting approaches (e.g., `semilogy`, `semilogx`, and `loglog`) to determine the best way to graph your results.

5. This problem requires you to generate temperature-conversion tables. Use the following equations, which describe the relationships between temperatures in degrees Fahrenheit \( T_F \), degrees Celsius \( T_C \), Kelvins \( T_K \), and degrees Rankine \( T_R \), respectively:

\[ T_F = T_R - 459.67^\circ R \]

\[ T_F = \frac{9}{5} T_C + 32^\circ F \]

\[ T_R = \frac{9}{5} T_K \]

**You will need to rearrange these expressions to solve some of the problems.**

Solve the problem by creating a primary function should be called `temperature_conversions` and should include the subfunctions `F2K`, `C2R`, `C2F`.

Within the primary function use the subfunctions to:

(a) Generate a conversion table for values from \( 0^\circ F \) to \( 200^\circ F \). Include a column for temperature in Fahrenheit and Kelvin.

(b) Generate a conversion table from \( 0^\circ C \) to \( 100^\circ C \). Print 25 lines in the table. (Use the `linspace` function to create your input vector.) Your table should include a column for temperature in Celsius and Rankine.

(c) Generate a conversion table from \( 0^\circ C \) to \( 100^\circ C \). Choose an appropriate spacing. Include a column for temperature in Celsius and Fahrenheit.

Recall that you will need to call your primary function from the command window or from a script M-file.