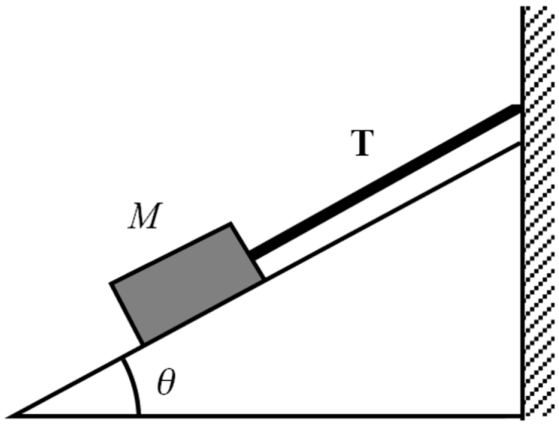
Lab 2

Due: Tuesday, September 22

1 Tension in a cable

A block of mass M is held motionless on a frictionless inclined plane by the means of a string attached to the vertical wall (the string is parallel to the plane). The mass of the object is 10 kg. Calculate the tension in the rope for angles between 0° and 90° in 5° increments.



The equation giving the tension in the rope is:

$$T = Mg\sin\theta$$

Write a C++ function which accepts M and θ and returns T. Declare g as a constant global variable. Use a loop to iterate over θ and print the tension for each value of θ. Your loop should depend upon variables for the starting, stopping, and increment value of theta (i.e. don't hard code these into your loop).

2 Max Value of a function

Consider the function

$$f(x) = 3x^3 + x^2 - 2x + 1$$

We wish to calculate the maximum of this function over the range $x \in (-2, 2)$. Write a C++ program which calculates and stores in an array the values of $f(x)$ over the interval (-2,2) in step sizes of at most $\Delta x = 0.1$. After filling the array, you should determine the maximum value of the array. Print this value to the user.