

## Assignment 1

1. When a ball is thrown with a speed  $U$  m/s at an angle of  $T$  radians with the horizontal, the horizontal distance travelled or range,  $R$  metres, is given by:-

$$R = U * U * \sin( 2 * T ) / 9.8$$

Write a **C** program to produce a table showing the range of the ball for speeds in the range **10** to **40** m/s in steps of **10** m/s and angles with the horizontal in the range **15** to **75** degrees in steps of **15** degrees. The output from the program should be as follows:-

```
*****
* Speed(m/s) * Angle(degrees) * Range(m) *
*****
*      10      *      15      *          *
*      10      *      30      *          *
*      10      *      45      *          *
*      10      *      60      *          *
*      10      *      75      *          *
*      20      *      15      *          *
*      20      *      30      *          *
*      20      *      45      *          *
*      20      *      60      *          *
*      20      *      75      *          *
*      30      *      15      *          *
*      30      *      30      *          *
*      30      *      45      *          *
*      30      *      60      *          *
*      30      *      75      *          *
*      40      *      15      *          *
*      40      *      30      *          *
*      40      *      45      *          *
*      40      *      60      *          *
*      40      *      75      *          *
*****
```

Hint: 180 degrees = 3.1416 radians

[5]

2. Create a class **cube** with one instance variable **length** containing methods to calculate the area of the base of the cube, the total surface area of the cube, the volume of the cube, the length of the face diagonal of the cube and the length of the body diagonal of the cube. The skeleton of the class is given below:-

```
class cube
{
    private:
        double length;
    public:
        cube( double length_value )
        {
            ...
        }
        double base_area( )
        {
            ...
        }
        double total_surface_area( )
        {
            ...
        }
        double volume( )
        {
            ...
        }
        double length_of_face_diagonal( )
        {
            ...
        }
        double length_of_body_diagonal( )
        {
            ...
        }
};
```