Q.1 a) Using Python plot the graph of function f(x) = cos(x) on the interval [0, 2π].

```
Import matplotlib.pyplot as plt
Import numpy as np
X=np.linspace(0,2*np.pi)
F=np.cos(x)
Plt.plot(x,f)
Plt.show()
```

(b) Following is the information of students participating in various games in a school.

```
Import matplotlib.pyplot as plt
Left=[1,2,3,4,5]
Height=[65,30,54,10,20]
Tick_label=['Cricket','Football','Hockey','Chess','Tennis']
Plt.bar(left,height,tick_label=tick_label,width=0.7,color=['red'])
Plt.xlabel('Game')
Plt.ylabel('Number of Students')
Plt.title('Bar Graph')
Plt.show()
```

Q.2 b)

```
Import numpy as npA = np.array([2, 1])

B = ([4, -1])

T = np.array([[1, 2], [2, 1]])

A_transformed = np.dot(T, A)

B_transformed = np.dot(T, B)

# Extract coordinates of transformed points

X1_transformed, y1_transformed = A_transformed

X2_transformed, y2_transformed = B_transformed

M_transformed = (y2_transformed – y1_transformed) / (x2_transformed – x1_trAnsformed)

B_transformed = y1_transformed m_transformed * x1_transformed

# Format the equation of the transformed line

Equation_transformed = f’y = {m_transformed} * x + {b_transformed}’

Print(“Equation of transformed line: “, equation_transformed
```

Q.2 c)

```
X1, y1 = 0, 0

X2, y2 = 10, 10

# Calculate midpoint

Midpoint_x = (x1 + x2) / 2

Midpoint_y = (y1 + y2) / 2

# Print midpoint

Print(“Midpoint: ({}, {})”.format(midpoint_x, midpoint_y))
```

Q.3 a) i)

```
From pulp import*
Model=LpProblem(name=”Lp-Problem”,sense=LpMinimize)
X=LpVariable(name=’x’,lowBound=0)
Y=LpVariable(name=’y’,lowBound=0)
Model+=(x+y>=5)
Model+=(x>=4)
Model+=(y<=2)
Model+=3.5*x+2*y
Model
```

Q.3 b) i)

```
Import numpy as np
P = np.array([4, -2])
# Reflection through y-axis
Reflection_y_axis = np.array([-1, 1]) * P
# Scaling in X-coordinates by factor 3
Scaling_x = np.array([3, 1]) * P
# Scaling in Y-coordinates by factor 2.5
Scaling_y = np.array([1, 2.5]) * P
# Reflection through the line y = -x
Reflection_line = np.array([-P[1],-P[0]])
Print(“Original point P:”, P)
Print(“Reflection through y-axis:”, reflection_y_axis)
Print(“Scaling in X-coordinates by factor 3:”, scaling_x)
Print(“Scaling in Y-coordinates by factor 2.5:”, scaling_y)
Print(“Reflection through the line y = -x:”, reflection_line)
```