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4375.005

Q1.

```
Q is --> [ 2.00e+00  0.00e+00  0.00e+00]
[ 0.00e+00  2.00e+00  0.00e+00]
[ 0.00e+00  0.00e+00  0.00e+00]

p is --> [ 0.00e+00]
[ 0.00e+00]
[ 0.00e+00]

G is --> [-6.00e+00 -2.00e+00 -1.00e+00]
[-6.00e+00 -4.00e+00 -1.00e+00]
[ 2.00e+00  4.00e+00  1.00e+00]
[ 3.00e+00  6.00e+00  1.00e+00]

--> h is --> [-1.00e+00]
[-1.00e+00]
[-1.00e+00]
[-1.00e+00]
```

Q2.

```
w is -->[-0.8000000954977431, -0.8000000954977432]
b is 2.2000002793727877

margin size is --> 1.767766741944201

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support vectors is --> ['1.00', '1.00', '-1.00']
map with current data --> [[0.5, 1, 1], [1, 0.5, 1], [2, 2, -1]]
such that w.x+b = 1 or -1
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w.x + b > 0 for positive class
w.x + b < 0 for negative class
x is --> [-8.00e-01]
[-8.00e-01]
[ 2.20e+00]
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predict data -->
[[3, 5, 1], [3, 4, 1], [4, 6, 1], [5, 4, -1], [5, 2, -1], [5, 6, -1]]
data end with 1 means positive -1 means negative

```

Q3.

```

Q is -->
[ 2.00e+00      0      0      0      0      0      0      ... ]
[      0      2.00e+00      0      0      0      0      0      ... ]
[      0      0      0      0      0      0      0      ... ]
[      0      0      0      0      0      0      0      ... ]
[      0      0      0      0      0      0      0      ... ]
[      0      0      0      0      0      0      0      ... ]
[      0      0      0      0      0      0      0      ... ]

p is -->
[ 0.00e+00]
[ 0.00e+00]
[ 0.00e+00]
[ 1.00e+00]
[ 1.00e+00]
[ 1.00e+00]
[ 1.00e+00]
[ 1.00e+00]

G is -->
[-3.00e+00 -5.00e+00 -1.00e+00 -1.00e+00      0      0      0      ... ]
[-5.00e+00 -3.00e+00 -1.00e+00      0     -1.00e+00      0      0      ... ]
[-6.00e+00 -6.00e+00 -1.00e+00      0      0     -1.00e+00      0      ... ]
[ 5.00e+00  6.00e+00  1.00e+00      0      0      0     -1.00e+00 ... ]
[ 6.00e+00  5.00e+00  1.00e+00      0      0      0      0      ... ]
[      0      0      0     -1.00e+00      0      0      0      ... ]
[      0      0      0      0     -1.00e+00      0      0      ... ]
[      0      0      0      0      0     -1.00e+00      0      ... ]
[      0      0      0      0      0      0     -1.00e+00 ... ]
[      0      0      0      0      0      0      0      ... ]

```

```

--> h is -->
[-1.00e+00]
[-1.00e+00]
[-1.00e+00]
[-1.00e+00]
[-1.00e+00]
[ 0.00e+00]
[ 0.00e+00]
[ 0.00e+00]
[ 0.00e+00]
[ 0.00e+00]

```

Q4

```

w is --> [-0.49999779148947715, -0.499997791489477]
b is 4.9999819694795775

margin size is --> 2.8284396180235096

-----
support vectors is --> ['1.00', '1.00', '-1.00', '-0.50', '-0.50']
map with current data -->
[[3.0, 5.0, 1], [5.0, 3.0, 1], [6.0, 6.0, 1], [5.0, 6.0, -1], [6.0, 5.0, -1]]
such that  $w \cdot x + b = 1$  or  $-1$ 
-----
 $w \cdot x + b > 0$  for positive class
 $w \cdot x + b < 0$  for negative class
x is --> [-5.00e-01]
[-5.00e-01]
[ 5.00e+00]
[ 4.13e-07]
[ 4.13e-07]
[ 2.00e+00]
[ 5.00e-01]
[ 5.00e-01]

```