Part I

Q1:

Using the translate matrix and rotate matrix I get:

```
glTranslatef(-2, -3, 0);
```

```
>>> b
array([[ 1.,  1.,  0., -2.],
       [ 0.,  1.,  0., -3.],
       [ 0.,  0.,  1.,  0.],
       [ 0.,  0.,  0.,  1.]])
```

```
glRotatef(45, 1, 0, 0);
```

```
>>> c
array([[ 1.        ,  0.        ,  0.        ,  0.        ],
       [ 0.        ,  0.70710678, -0.70710678,  0.        ],
       [ 0.        ,  0.70710678,  0.70710678,  0.        ],
       [ 0.        ,  0.        ,  0.        ,  1.        ]])
>>>
```

```
glRotatef(45, 0, 1, 0);
```

```
>>> d
array([[ 0.70710678,  0.        ,  0.70710678,  0.        ],
       [ 0.        ,  1.        ,  0.        ,  0.        ],
       [-0.70710678,  0.        ,  0.70710678,  0.        ],
       [ 0.        ,  0.        ,  0.        ,  1.        ]])
```

```
glRotatef(30, 1, 0, 0);
```

```
>>> e
array([[ 1.        ,  0.        ,  0.        ,  0.        ],
       [ 0.        ,  0.8660254, -0.5       ,  0.        ],
       [ 0.        ,  0.5       ,  0.8660254,  0.        ],
       [ 0.        ,  0.        ,  0.        ,  1.        ]])
>>>
```

```
glRotatef(45, 0, -1, 0);
```

```
>>> f
array([[ 0.70710678,  0.        , -0.70710678,  0.        ],
       [ 0.        ,  1.        ,  0.        ,  0.        ],
       [ 0.70710678,  0.        ,  0.70710678,  0.        ],
       [ 0.        ,  0.        ,  0.        ,  1.        ]])
```

```
glRotatef(45, -1, 0, 0);
```

```
>>> g
array([[ 1.        ,  0.        ,  0.        ,  0.        ],
       [ 0.        ,  0.70710678,  0.70710678,  0.        ],
       [ 0.        , -0.70710678,  0.70710678,  0.        ],
       [ 0.        ,  0.        ,  0.        ,  1.        ]])
```

```
glTranslatef(2, 3, 0);
```

```
>>> h
array([[1., 1., 0., 2.],
       [0., 1., 0., 3.],
       [0., 0., 1., 0.],
       [0., 0., 0., 1.]])
>>>
```

Then I can get M:

```
>>> M = b*c*d*e*f*g*h
>>> M
array([[ 0.5       ,  0.        , -0.        , -0.        ],
       [ 0.        ,  0.4330127 ,  0.        , -0.        ],
       [-0.        , -0.        ,  0.21650635,  0.        ],
       [ 0.        ,  0.        ,  0.        ,  1.        ]])
>>>
```

Q2:

```
glTranslatef(2, 3, 0);
glRotatef(45, -1, 0, 0);
glRotatef(45, 0, -1, 0);
glRotatef(30, 1, 0, 0);
glRotatef(45, 0, 1, 0);
glRotatef(45, 1, 0, 0);
glTranslatef(-2, -3, 0);
DrawCube();
```