1- We can remove artifacts using Mipmapping.
Because the distant end of the floor is small and we don't have enough pixels to choose enough samples.

2- In Gouraud shading we only calculate the illumination for the vertices. As a result we don't have enough samples. But in Phong shading we calculate the illumination for all the pixels and we have more samples.

3- $n^2(k-1) + 1 \geq 50$ => $7n^2+1 \geq 50$ => $n = 3$
So we will reduce the spatial resolution by factor of 9.

4- **a)** Axes aligned bounding box of A: (6,6), (6,2), (2,2), (2,6)
Axes aligned bounding box of B: (9,16), (9,8), (1,8), (1,16)
b) No, because the distance of center of A and B is larger than sum of their radiuses.
c) New bounding box of B: (10,10), (10,2), (2,2), (2,10)
Now A and B are colliding because the distance of their centers are smaller than the sum of their radiuses.

5- **a)** Torso – Left Shoulder – Left Elbow – Left Wrist – Neck – Right Shoulder – Right Elbow – right Wrist
b) Using the push and pop to add and remove the transformation in the OpenGL stack.

6- The gamma function of the display and the camera is different. So we should find the relation between these gamma functions and change the input intensity in a way that we get same output for both of them.

7- For opaque objects we should start from the one which is closer to the camera so first we render 1 and 3 and then 5. For translucent object we should start from the one which is far away from the camera. So we render 4 and after that we render 2.

8- $P_0 = (0,0,0)$
$P_1 = (50,50,50)$ (because the image plane is perpendicular to z axis and the distance of it to origin is 50 then the z coordinate of all the points on image plane is 50)
So now we have two points of the ray and we can write the parametric equation of the ray:
$P = P_0 + t(P_1 - P_0)$ => $P = (50t, 50t, 50t)$
Now we can put the coordinate of P in the equation of the plane to find the intersection.
$x+y+z = 200\sqrt{3}$ => $50t+50t+50t=200\sqrt{3}$ => $t = \frac{4\sqrt{3}}{3}$
$P = \left(\frac{200\sqrt{3}}{3}, \frac{200\sqrt{3}}{3}, \frac{200\sqrt{3}}{3}\right)$

9- **a)** $\begin{bmatrix} t^2 \\ t \\ 1 \end{bmatrix}$

b) 2 points
c) $\begin{bmatrix} 1 & -2 & 1 \\ -1 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} t^2 \\ t \\ 1 \end{bmatrix} = t^2 - t + 1$

10- **a)** G^0 continuity
b) The tangents at P2 should be in a same direction so we have:

$$\frac{T2}{|T2|} = \frac{T3}{|T3|}$$