**CPSC 453 – Self-test – Oct 7-8, 2019**

1) Who developed the first interactive graphics system:

 Ivan Sutherland at MIT?

 Alvy Ray Smith At the University of Utah?

Marceli Wein and Nestor Burtnyk at the NRC?

2) What is the value of $\sin(\left(\frac{π}{4}\right))$ ?

3) What does it mean that vector multiplication is distributive over addition?

4) Does the equality $\vec{a}\left(\vec{b}∙\vec{c}\right)=\left(\vec{a}∙\vec{b}\right)\vec{c}$ hold for any vectors $\vec{a}, \vec{b}, \vec{c}$ ? Some vectors? Never? Justify your answer.

5) Consider vectors defined as follows:

struct V3f

{

 float x, y, z;

 V3f(float x1, float y1, flat z1)

 {x=x1; y=y1; z = z1}

 V3f()

 {x=0; y=0; z=0}

};

Define the overloaded operator ^ for computing the cross product of two vectors in C++.

6) Write the transformation matrix for rotating by angle $α$ around the $x$ axis in 3D.

7) Point $P$ has homogeneous coordinates $\left[4 2 1 0.5\right]^{T}$ . What are its $x, y, z $coordinates in 3D?

7) Which of the following operation(s) cannot be performed as matrix multiplication unless homogeneous coordinates are used:

 Translation

 Scaling with respect to the origin of the coordinate system

 Parallel projection

 Perspective projection

 Rotation with respect to the origin of the coordinate system

8) What is Rodrigues’s formula for?

9) What is the “canonical view volume”

10) Oblique projections are a special case of:

Orthographic projections

Parallel projections

One-point perspective

Two-point perspective

Three-point perspective