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

1) Who developed the first interactive computer animation 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 $\tan(\left(\frac{π}{4}\right))$ ?

3) Which of the following operation(s) is/are commutative:

Vector addition

Vector subtraction

Dot Product

Cross product

Multiplication of a vector by a number.

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 dot product of two vectors in C++.

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

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

7) Which of the following operation(s) can be performed as matrix multiplication without using homogeneous coordinates:

 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 are the normalized device coordinates (NDC)?

10) Oblique projections are a special case of:

Orthographic projections

Parallel projections

One-point perspective

Two-point perspective

Three-point perspective