

**Question 1**

Correct

Mark 1.00 out of  
1.00

A transformation given by the following matrix is applied to a point  $(-3, 5, 2, 1)$ .

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

What are the coordinates of the transformed point?

Select one:

- ☐ a.  $(0, -1, 0, 1)$ .
- ☐ b.  $(-3, -5, 2, 1)$ .
- ☐ c.  $(-3, -1, 2, 1)$ .
- ☐ d.  $(-3, 5, 2, 1)$ .
- ☒ e.  $(-3, 4, 2, 1)$ . ✓

Check

Your answer is correct.

**Correct**

Marks for this submission: 1.00/1.00.

### Question 2

Correct

Mark 1.00 out of 1.00

A **vector**  $(x, y, z, 0)$  is transformed using the following matrix:

$$\begin{bmatrix} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & 7 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

What are the components of the transformed vector?

Select one:

- ☐ a.  $(x+7, y+3, z+7, 0)$
- ☐ b.  $(7, 3, 7, 0)$
- ☐ c.  $(7x, 3y, 7z, 0)$
- ☒ d.  $(x, y, z, 0)$ . ✓
- ☐ e.  $(x+7, y+3, z+7, 1)$

Check

**Correct**

Marks for this submission: 1.00/1.00.

### Question 3

Correct

Mark 0.75 out of 1.00

What transformation does the following 4x4 matrix represent?

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 \\ 0 & -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Select one:

- ☐ a. A scale transformation by factors  $(1, 1/\sqrt{2}, 1/\sqrt{2})$
- ☐ b. A rotation of a point by 45 degs about the x-axis
- ☐ c. A rotation of a point by  $-90$  degs about the x-axis
- ☒ d. A rotation of a point by  $-45$  degs about the x-axis ✓
- ☐ e. A rotation of a point by 90 degs about the x-axis

Check

Your answer is correct.

**Correct**

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.75/1.00**.

**Question 4**

Correct

Mark 0.75 out of  
1.00

What transformation does the following matrix represent?

$$\begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Select one:

- ☒ a. A rotation about the y-axis by 90 degs. ✓
- ☐ b. A reflection along the z-axis
- ☐ c. A translation by (1, 1, -1)
- ☐ d. A rotation about the y-axis by -90 degs.
- ☐ e. Scaling by (1, 1, -1)

Check**Correct**Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.75/1.00**.**Question 5**

Correct

Mark 0.75 out of  
1.00

A triangle is assigned a diffuse material colour Yellow (1, 1, 0). The angle between the light source vector and the surface normal vector at a vertex V of the triangle is 60 degs. If the light has diffuse colour (1, 0, 1), what will be the colour of diffuse reflection at V?

Select one:

- ☐ a. (1, 0, 0)
- ☐ b. (1, 0.5, 0.5)
- ☐ c. (0.5, 1, 1)
- ☒ d. (0.5, 0, 0) ✓
- ☐ e. (0.5, 0, 0.5)

Check**Correct**Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.75/1.00**.

### Question 6

Correct

Mark 1.00 out of  
1.00

At a vertex, the diffuse term  $I \cdot n$  has a value  $-0.3$ . The light's diffuse colour is  $(1, 1, 1)$ , and the material's diffuse colour is  $(0, 1, 1)$ . The colour of diffuse reflection at the vertex is

Select one:

- ☐ a.  $(0, 1, 1)$
- ☒ b.  $(0, 0, 0)$  ✓
- ☐ c.  $(0, 0.3, 0.3)$
- ☐ d.  $(0, -0.3, -0.3)$
- ☐ e.  $(1, 0.7, 0.7)$

Check

**Correct**

Marks for this submission: 1.00/1.00.

### Question 7

Correct

Mark 1.00 out of  
1.00

The half-way vector used by OpenGL in the computation of specular reflections is

Select one:

- ☐ a. A vector got by adding the normal vector and the reflection vector.
- ☐ b. A vector got by adding the light source vector and the normal vector.
- ☐ c. A vector got by adding the light source vector and the reflection vector.
- ☐ d. A vector got by adding the normal vector and the view vector.
- ☒ e. A vector got by adding the light source vector and the view vector. ✓

Check

**Correct**

Marks for this submission: 1.00/1.00.

### Question 8

Correct

Mark 0.75 out of  
1.00

Consider the vectors  $l$ ,  $v$ ,  $n$ ,  $r$ ,  $h$  used for lighting computation at a vertex. When the reflection vector  $r$  coincides with the view vector  $v$ , what happens to the half-way vector  $h$ ?

Select one:

- ☐ a. The half-way vector  $h$  coincides with the reflection vector  $r$ .
- ☐ b. The half-way vector  $h$  becomes perpendicular to the normal vector  $n$ .
- ☐ c. The half-way vector  $h$  coincides with the light source vector  $l$ .
- ☐ d. The half-way vector  $h$  becomes perpendicular to the light source vector  $l$ .
- ☒ e. The half-way vector  $h$  coincides with the normal vector  $n$ . ✓

Check

Your answer is correct.

**Correct**

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.75/1.00**.

### Question 9

Correct

Mark 1.00 out of  
1.00

Which one of the following statements is true? ( $l$  = light source vector,  $v$  = view vector,  $n$  = normal vector,  $r$  = reflection vector)

Select one:

- ☒ a. The intensity of specular reflection seen by the viewer is maximum when  $v$  coincides with  $r$ . ✓
- ☐ b. The intensity of specular reflection seen by the viewer is maximum when  $n$  is parallel to  $v$
- ☐ c. The intensity of specular reflection seen by the viewer is maximum when  $l$  is parallel to  $n$
- ☐ d. The intensity of specular reflection seen by the viewer is maximum when  $r$  is perpendicular to  $v$
- ☐ e. The intensity of specular reflection from a vertex does not change with the view vector  $v$ .

Check

**Correct**

Marks for this submission: 1.00/1.00.

### Question 10

Correct

Mark 1.00 out of  
1.00

The term  $\mathbf{h} \cdot \mathbf{n}$  in the lighting equation (see slide [8]-13) is an approximation of which one of the following terms?

( $\mathbf{l}$  = light source vector,  $\mathbf{r}$  = reflection vector,  $\mathbf{n}$  = normal vector,  $\mathbf{v}$  = view vector)

Select one:

- ☐ a.  $\mathbf{r} + \mathbf{v}$
- ☐ b.  $\mathbf{r} \cdot \mathbf{n}$
- ☐ c.  $\mathbf{l} \cdot \mathbf{n}$
- ☐ d.  $\mathbf{l} + \mathbf{v}$
- ☒ e.  $\mathbf{r} \cdot \mathbf{v}$  ✓

Check

Your answer is correct.

**Correct**

Marks for this submission: 1.00/1.00.