Question 1

Correct

Mark 2.00 out of 2.00

Flag question

The area of the triangle that is determined by $P = (0,0,0),\ Q = (1,2,3),\ R = (3,2,1)$ is

Select one:

- $2\sqrt{2}$
- $2\sqrt{6}$ ✔
- $4\sqrt{6}$
- $8\sqrt{3}$
- $4\sqrt{2}$

The correct answer is: $2\sqrt{6}$

Question 2

Incorrect

Mark 0.00 out of 2.00

Flag question

The graph of the equation $x^2 - y^2 + z^2 - 4x + 2y - 6z = k$ is a cone if

Select one:

- $k = 0$ ✖
- $k = 12$
- $k > 12$
- $k = -12$

The correct answer is: $k = -12$

Question 3

Incorrect

Mark 0.00 out of 2.00

Flag question

ai+bj is a non-zero vector perpendicular to

2i-j+3k, then $\frac{a^2+b^2}{a^2} =$

Select one:

- 2
- 3 ✖
- 4
- 1
- 5

The correct answer is: 5

Question 4

Correct

Mark 2.00 out of 2.00

Flag question

If $\vec{a}$ and $\vec{b}$ are two unit vectors with $comp_{\vec{a}}\ \vec{b} = \sqrt{5}$ and $proj_{\vec{a}}\ \vec{b} = i + 2j$ then $\vec{a}$ equals

Select one:

- $-i$
- j
- $\frac{1}{\sqrt{5}}(2i + j)$
- i
- $\frac{1}{\sqrt{5}}(i + 2j)$ ✔

The correct answer is: $\frac{1}{\sqrt{5}}(i + 2j)$

Question 5

Incorrect

Mark 0.00 out of 2.00

Flag question

If $\vec{u} \cdot \vec{v} = \sqrt{6}$ and $\vec{u} \times \vec{v} = 3j + 3k$, then the angle between $\vec{u}$ and $\vec{v}$ is

Select one:

- $\frac{\pi}{3}$
- $\frac{\pi}{6}$
- $\frac{\pi}{4}$ ✖
- π
- $\frac{2\pi}{3}$

The correct answer is: $\frac{\pi}{3}$

Question 6

Correct

Mark 2.00 out of 2.00

Flag question

Symmetric equations for the line through the point $(1, -2, -4)$ that is orthogonal to the plane $2x - y + 3z = 5$ are given by

Select one:

- $\frac{x+1}{2} = \frac{y-2}{-1} = \frac{z-4}{3}$
- $\frac{x-1}{2} = \frac{y+2}{-1} = \frac{z+4}{3}$ ✔
- $\frac{x-1}{2} = y + 2 = \frac{z+4}{3}$
- $\frac{x-1}{\sqrt{14}} = \frac{y+2}{\sqrt{14}} = \frac{z+4}{\sqrt{14}}$
- $\frac{x+1}{\sqrt{14}} = \frac{y-2}{\sqrt{14}} = \frac{z-4}{\sqrt{14}}$

The correct answer is: $\frac{x-1}{2} = \frac{y+2}{-1} = \frac{z+4}{3}$

Question 7

Correct

Mark 2.00 out of 2.00

Flag question

The equation $4x^2 + 4y^2 + 4z^2 = 16y - 12z + 3$ represents

Select one:

- a sphere with center $(0, -2, \frac{3}{2})$ and radius 7
- a point
- a sphere with center $(0, 0, 0)$ and radius $\sqrt{3}$
- a sphere with center $(0, 2, -\frac{3}{2})$ and radius $\sqrt{7}$ ✔
- no graph in $\mathbb{R}^3$

The correct answer is: a sphere with center $(0, 2, -\frac{3}{2})$ and radius $\sqrt{7}$

Question 8

Correct

Mark 2.00 out of 2.00

Flag question

Let $\mathbf{r}(t) = e^t\mathbf{i} + (e^t \sin t)\mathbf{j} + (e^t \cos t)\mathbf{k}, 0 \leq t \leq \pi$. Then the unit tangent vector $\mathbf{T}(t)$ is

Select one:

- $T(t) = \sin t\, \mathbf{j} + \cos t\, \mathbf{k}$
- $T(t) = \frac{1}{\sqrt{3}}(\mathbf{i} + (\sin t + \cos t)\mathbf{j} + (\sin t - \cos t)\mathbf{k})$
- $T(t) = \frac{1}{\sqrt{3}}(\mathbf{i} + (\sin t + \cos t)\mathbf{j} + (\cos t - \sin t)\mathbf{k})$ ✔
- $T(t) = \mathbf{i} + (\sin t + \cos t)\mathbf{j} + (\sin t - \cos t)\mathbf{k}$

The correct answer is: $T(t) = \frac{1}{\sqrt{3}}(\mathbf{i} + (\sin t + \cos t)\mathbf{j} + (\cos t - \sin t)\mathbf{k})$

Question 9

Correct

Mark 2.00 out of 2.00

Flag question

Let $\mathbf{r}(t) = e^t\mathbf{i} + (e^t \sin t)\mathbf{j} + (e^t \cos t)\mathbf{k}, 0 \leq t \leq \pi$. Then the tangential component of acceleration is

Select one:

- $a_T = \sqrt{3}e^t$ ✔
- $a_T = 3e^t$
- $a_T = 2\sqrt{3}e^{2t}$
- $a_T = 6e^{2t}$

The correct answer is: $a_T = \sqrt{3}e^t$

Question 10

Correct

Mark 2.00 out of 2.00

Flag question

Let $\vec{r} = x\,i + y\,j + z\,k$, $\vec{v} = i + 2\,j + 3\,k$ and $\vec{w} = i + j + k$. The equation $(\vec{r} - \vec{v}) \cdot (\vec{r} - \vec{w}) = 0$ represents

Select one:

- a line
- two line segments
- a point
- a sphere ✔
- two lines

The correct answer is: a sphere

Question 11

Correct

Mark 2.00 out of 2.00

Flag question

Let $\mathbf{r}(t) = e^t\mathbf{i} + (e^t \sin t)\mathbf{j} + (e^t \cos t)\mathbf{k}, 0 \leq t \leq \pi$. Then the length of the curve $\mathbf{r}(t), 0 \leq t \leq \pi$ is

Select one:

- $3(e^{\pi} - 1)$
- $\sqrt{3}(e^{2\pi} - 1)$
- $3(e^{2\pi} - 1)$
- $\sqrt{3}(e^{\pi} - 1)$ ✔

The correct answer is: $\sqrt{3}(e^{\pi} - 1)$

Question 12

Correct

Mark 2.00 out of 2.00

Flag question

If the line $x = 2 + 3t,\ y = -4t,\ z = 5 + t$ intersects the plane $2x - y + z = -2$ at (a, b, c) then $a + b + c =$

Select one:

- 7 ✔
- -2
- 8
- 5
- 4

The correct answer is: 7

Question 13

Correct

Mark 2.00 out of 2.00

Flag question

Let $\mathbf{r}(t) = e^t\mathbf{i} + (e^t \sin t)\mathbf{j} + (e^t \cos t)\mathbf{k}, 0 \leq t \leq \pi$. Then $|v(t)|^2 =$

Select one:

- $\sqrt{3}e^t$
- $3e^{2t}$ ✔
- $3e^t$
- $\sqrt{3}e^{2t}$

The correct answer is: $3e^{2t}$

Question 14

Correct

Mark 2.00 out of 2.00

Flag question

Let $\mathbf{r}(t) = \cos^3 t\mathbf{i} + \sin^3 t\mathbf{j}, 0 \leq t \leq \frac{\pi}{2}$. Then the curvature κ is

Select one:

- $\frac{1}{3}\csc(2t)$
- $3\sin(2t)$
- $\frac{2}{3}\csc(2t)$ ✔
- $3\csc(2t)$

The correct answer is: $\frac{2}{3}\csc(2t)$

Question 15

Correct

Mark 2.00 out of 2.00

Flag question

If $\vec{u} = a\,i + b\,j + c\,k$ is a unit vector which is perpendicular to both vectors $i + j$ and $i + k$ then one of the possibilities of $\sqrt{3}(a + b + c)$ is

Select one:

- -2
- 1 ✔
- 2
- 0
- $3\sqrt{3}$

The correct answer is: 1