1. [**Q#12 p.794**]

Consider a line that passes through the point $(5, -3, -4)$ and is parallel to the vector $\vec{u} = \langle 2, -1, 3 \rangle$. If this line also passes through the point $(7, -4, a)$, then a is equal to

(a) -1 (correct)
(b) 4
(c) 0
(d) -2
(e) -3

2. [**Q#49 p.795**]

An equation of the plane passing through the point $(1, 2, 3)$ and parallel to the xy-plane is

(a) $z = 3$ (correct)
(b) $x = 1$
(c) $y = 2$
(d) $x + y + z - 6 = 0$
(e) $x + y - 3 = 0$

3. [**Example#3 p.802**]

The surface given by the equation $x - y^2 - 4z^2 = 2$ is:

(a) Elliptic paraboloid (correct)

(b) Ellipsoid

(c) Hyperboloid of one sheet

(d) Hyperboloid of two sheets

(e) Elliptic cone

4. [**Q#27 p.880**]

The range of $f(x, y) = \sqrt{4 - x^2 - y^2}$ is

(a) $[0, 2]$ (correct)

(b) $[0, \infty)$

(c) $[2, \infty)$

(d) $(-\infty, \infty)$

(e) $(0, 4)$

5. [**Q#60 p.893**]

$$\lim_{(x,y)\to(0,0)} (x^2+y^2)\ln(x^2+y^2) =$$

(a) 0 (correct)

(b) $\ln(2)$

(c) 2

(d) 1

(e) ∞

6. [**Q#54 p.881**]

The level curve of the function $f(x,y) = \sqrt{9-x^2-y^2}$ passing through the point $(2, \sqrt{5}, f(2, \sqrt{5}))$ is a circle of radius:

(a) 3 (correct)

(b) 1

(c) 2

(d) $\sqrt{5}$

(e) 9

7. [**Q#36 p.891**]

Consider the following statements about the function

$$f(x,y,z) = \frac{xy + yz^2 + xz^2}{x^2 + y^2 + z^2}$$

(I) $\lim\limits_{(x,y)\to(0,0)} f(x,y,0) = 0$

(II) $\lim\limits_{(x,z)\to(0,0)} f(x,0,z) = 0$

(III) $\lim\limits_{x\to 0} f(x,x,x) = \frac{1}{3}$

Then

(a) (II) and (III) are true (correct)

(b) (I) and (II) are true

(c) (I) and (III) are true

(d) only (III) is true

(e) only (I) is true

8. [**Q#93 p.901**]

If $f(x,y,z) = e^{-x}\sin(yz)$, then $f_{xyy} =$

(a) $e^{-x}z^2\sin(yz)$ (correct)

(b) $e^{-x}\cos(yz)$

(c) $-e^{-x}z^2\cos(yz)$

(d) $e^{-x}y^2\cos(yz)$

(e) $-e^{-x}\sin(yz)$

9. [**Q#18 p.909**]

Using total differential, the expression $5\sqrt{(4.03)^2+(3.1)^2} - 5\sqrt{4^2+3^2}$ is approximately equal to

(a) 0.42 (correct)

(b) 0.50

(c) 0.35

(d) 0.30

(e) 0.60

10. [**Q#18 p.917**]

Let $w = x^2 - y^2$, where $x = s\cos t$ and $y = s\sin t$. The value of $\dfrac{\partial w}{\partial t}$ when $s = 3$ and $t = \dfrac{\pi}{4}$ is equal to

(a) -18 (correct)

(b) -12

(c) 9

(d) 3

(e) 6

11. [**Q#31 p.917**]

If $\tan(x+y)+\cos z=2$, then $\dfrac{\partial z}{\partial x}+\dfrac{\partial z}{\partial y}=$

(a) $\dfrac{2\sec^2(x+y)}{\sin z}$ (correct)

(b) $-\dfrac{\sec^2(x+y)}{\sin z}$

(c) $\dfrac{2\tan(x+y)}{\cos z}$

(d) $\dfrac{\tan^2(x+y)}{\cos z}$

(e) $\dfrac{\csc^2(x+y)}{\sin z}$

12. [**Q#13 p.928**]

The directional derivative of $f(x,y)=e^y\sin x$ at the point $P(0,0)$ in the direction of the vector $\overrightarrow{PQ}$, where $Q(2,1)$, is equal to

(a) $\dfrac{2}{\sqrt{5}}$ (correct)

(b) $\dfrac{3}{\sqrt{5}}$

(c) $\dfrac{1}{\sqrt{5}}$

(d) 2

(e) $-\sqrt{5}$

13. [**Example 2 p.933**]

An equation of the tangent plane to the surface $z^2 - 2x^2 - 2y^2 = 12$ at the point $(1, -1, 4)$ is given by $x + ay + bz + c = 0$, then $a + b + c =$

(a) 3 (correct)

(b) 6

(c) 9

(d) 12

(e) 1

14. [**Q#31 p.937**]

A set of symmetric equations for the tangent line to the curve of intersection of the surfaces

$$x^2 + y^2 + z^2 = 14 \text{ and } x - y - z = 0$$

at the point $(3, 1, 2)$ is

(a) $x - 3 = \dfrac{y-1}{5} = \dfrac{z-2}{-4}$ (correct)

(b) $x - 3 = \dfrac{y-1}{-5} = \dfrac{z-2}{4}$

(c) $\dfrac{x-3}{2} = \dfrac{y-1}{5} = \dfrac{z-2}{-4}$

(d) $\dfrac{x-3}{2} = \dfrac{y-1}{10} = \dfrac{z-2}{-7}$

(e) $\dfrac{x-3}{4} = y - 1 = \dfrac{z-3}{5}$

15. [**Q#94 p.796**]

The distance between the planes given by the equations

$$-x + 6y + 2z = 3 \text{ and } -\frac{1}{2}x + 3y + z = 4$$

is

(a) $\dfrac{5}{\sqrt{41}}$ (correct)

(b) $\dfrac{3}{\sqrt{41}}$

(c) $\dfrac{7}{\sqrt{41}}$

(d) $\dfrac{1}{\sqrt{41}}$

(e) $\dfrac{8}{\sqrt{41}}$