

1st Term : 2022 – 2023

Midterm Exam.

Program : Mathematics
& Computer Science

Course : Mathematical Analysis I

Course Code : MT206

Level: (2) Second Year

Instructor : Dr. Adel Khalil

Date: 15/11/2022

Total Pages: 2

Total Marks : 30

Time Allowed: 1 Hour

A. Are the following statements true (\checkmark) or false (\times) ? (One mark and half each)

- ✓ 1- The line $x=4t-2, y=6t-7, z=5t+2$ lies in the plane $3x-2y=8$
- ✓ 2 - If α, β , and γ are direction angles of a vector, then $\frac{\cos 2\alpha + \cos 2\beta + \cos 2\gamma}{\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma} = -1$
- ✓ 3- In the space, the equation $x^2 + z^2 = 9, y=3$ represents a circle with radius 3 and center at $(0,3,0)$
- ✗ 4- The two lines $\frac{1-2x}{2} = \frac{2y-1}{4} = \frac{z}{2}$ & $(x=5-3t, y=6t+1, z=-5+6t)$ are perpendicular
- ✗ 5- The distance from the point $(-1,2,1)$ to the plane $3x-4z+2=0$ is -1
- ✓ 6- The spherical equation of the paraboloid $z=x^2+y^2$ is $\rho = \cos \varphi \csc^2 \varphi$
- ✓ 7- If a vector makes an angle γ with z-axis then $\cos^2 \gamma + \sin^2 \gamma = 1$
- ✗ 8- The equation $x^2 + y^2 + z^2 + 8x - 2y + z + 21 = 0$ represents a sphere with center $(-4,1,0)$
- ✓ 9- Skew lines must fall in two different planes
- ✓ 10- The three points $A \equiv (1,-3,2), B \equiv (4,1,0)$, and $C \equiv (7,5,-2)$ are collinear
- ✓ 11- If $A \equiv (1,-3,k), B \equiv (9,k,5), C \equiv (k,0,4)$, and $AB \perp BC$ then $k = -1$
- ✗ 12 - If a vector makes three equal acute angles α, β , and γ with the three coordinate axes Ox, Oy , and Oz , then $\alpha = \beta = \gamma = \sin^{-1} \left(\sqrt{\frac{3}{2}} \right)$
- ✗ 13- In the space, the equation $2x+z+13=0$ represents a plane parallel to xz - plane
- ✓ 14- The direction ratios of the line $(x+2y=z \text{ \& } 2x+y=z+5)$ is given by $\langle 1,1,3 \rangle$
- ✓ 15- If the two vectors $\langle 1,b,-2 \rangle, \langle b,1,2 \rangle$ are parallel then $b = -1$
- ✗ 16- The equation of xz -plane is $x=0, y=0$
- ✓ 17- If the plane $x-y+2z=0$ is perpendicular the plan $2x-2y=5-az$ then $a = -2$
- ✗ 18. The direction cosines of the line $\frac{1+2x}{2} = \frac{1-2y-1}{-4} = \frac{z}{2}$ is $\langle \frac{1,2,2}{\sqrt{5}} \rangle$
- ✓ 19. The line $2x=y=2-z$ intersects the plane $2x+y-z=22$ at the point $(4,8,-6)$
- ✗ 20. The plane $x-3y=2$ is passing through Z -axis

With my best wishes