

MATH 241 – 007

Group #1: Non-calculus topics review questions

Shadhan Alkharusi:

12.1 Coordinates in 3-space

1. Describe the object in 3-D: $z=e^x$
2. Find the intersection of a sphere with the xz -plane if the sphere's center is $(26,3)$ and has a radius of 6.

12.2 Vectors

1. Find a vector in the direction of $V=(3,1,1)$ with magnitude of 4.
2. Find a unit vector in the direction of the vector from $P_1=(2,2,2)$ to $P_2=(1,3,3)$.

Emma Black:

12.3 Dot product, Projections

1. Find the angle between the vectors $u=\sqrt{5}i - 9j$ and $v=\sqrt{5}i + j - 3k$. Answer in radians (round to the nearest hundredth).
2. For the two given vectors:

$$u = i + j + k$$

$$v = 5i - 2k$$

- a. Find the dot product
- b. Find the cosine of the angle between v and u
- c. Find the scalar component of u in the direction of v
- d. Find the vector projection of u onto v

Britton Board:

12.4 Cross and Triple products

1. Find a unit vector parallel to the plane PQR where $P=(1,1,1)$, $Q=(2,1,3)$, and $R=(3,-1,1)$.
2. Find the volume of a parallelepiped if four of its eight vertices are $A(0,0,0)$, $B(1,2,0)$, $C(0,-3,2)$, and $D(3,-4,5)$.

Tom Cusack:

12.5 Equations of lines and planes

1. Find the parametric equations for a line through $P=(4,0,-2)$ and $Q=(1,-3,-5)$.
2. Find the point where the line $x=4+4t, y=5t-2, z=3$, intersects the plane $x+4y-2z=2$.

Hunter Farr:

12.5 Equations of lines and planes. Angles

1. Find the angle between the vectors $u=6i+10j$ and $v=10i+12j+4k$.
2. Find the measures of the angles of the triangle whose vertices are $A=(-1,0)$, $B=(2,1)$, $C=(3,-3)$.

Ivan Fernandez:

12.5 Equations of lines and planes. Intersections

1. Find the plane determined by the intersecting lines.
 $L1: x=2t+4 \ y=3t+3 \ z=4t+5 \ -\infty < t < \infty$
 $L2: x=s+3 \ y=4s-1 \ z=-2s+7 \ -\infty < s < \infty$
2. Find the point of intersection of the lines given below and then find the plane determined by these lines.
 $L1: x=2t+4 \ y=3t+3 \ z=4t+5 \ -\infty < t < \infty$
 $L2: x=s+3 \ y=4s-1 \ z=-2s+7 \ -\infty < s < \infty$

Michael Miller:

12.5 Equations of lines and planes. Distances

1. Compute the distance from the point $P=(3,2,5)$ to the line that passes through the two points $A=(1,1,1)$ and $B=(2,2,3)$.
2. Find the distance between the two planes $2x-3y+z=7$ and $6x-9y+3z=2$.

Austin Sharpe:

12.6 Cylinders and Quadratic surfaces

1. Identify and Sketch the quadric surface $(4/9)x^2 + y^2 - 4z^2 = 1$.
2. Find the equation of the cross-section cut from the ellipsoid $(x^2)/4 + y^2 + (z^2)/16 = 1$ by the plane $z = 2x$, then find the area of this cross-section.