

## Math 2313, Test I

Name \_\_\_\_\_

1. Find the equation of the plane:

a. perpendicular to the line  $x = 1 - 3t, y = -2 + 4t, z = -1 + 2t$  and through the point  $(1, 2, -2)$ .

answer:  $-3x + 4y + 2z = 1$

b. through the points  $(0, 1, 0), (2, 1, 1), (0, 2, 1)$ .

answer:  $x + 2y - 2z = 2$

2. Find the equations of the normal line to the plane  $2x + y - z = 3$  through the point  $(1, 3, 2)$ .

answer:  $x = 2t + 1, y = t + 3, z = -t + 2$

3. Find the volume of the parallelepiped with edges  $\langle 2, 0, 4 \rangle$ ,  $\langle 0, 1, 2 \rangle$  and  $\langle -1, 2, 0 \rangle$ .

answer: 4

4. a. If  $r(t) = \langle t^4, t^3, t^2 \rangle$ , find the velocity vector,  $r'(t)$ , and the acceleration vector  $r''(t)$ .

answer:  $r'(t) = \langle 4t^3, 3t^2, 2t \rangle$ ,  $r''(t) = \langle 12t^2, 6t, 2 \rangle$

- b. Find parametric equations for the tangent line to the curve of part a, at  $(1, 1, 1)$ .

answer:  $x = 1 + 4t$ ,  $y = 1 + 3t$ ,  $z = 1 + 2t$

- c. Set up an integral which gives the length of the curve of part a, from  $(1, 1, 1)$  to  $(16, 8, 4)$ . Do not evaluate the integral.

answer:  $\int_1^2 \sqrt{16t^6 + 9t^4 + 4t^2} dt$