

Math 101C Ch. 10 Sample Test (from Spring 2009)

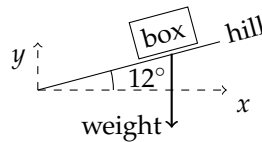
- Find a vector with magnitude 5 in the direction of $\langle 1, 4, 3 \rangle$.
- Find the equation of the line that passes through the points $(1, 2, 1)$ and $(1, -4, 2)$.
- Find the equation of the line that passes through the point $(3, 2, 1)$ and is perpendicular to the plane $3x - 2y + z = 10$.
- Find the equation of the plane containing the points $(1, 2, 1)$, $(3, 1, 0)$, and $(1, 2, 0)$.
- Find the area of the triangle with vertices $(1, 2, 1)$, $(-2, 1, 0)$, and $(1, 2, 3)$.
- Find the intersection of the lines

$$\begin{cases} x = 1 - 4t \\ y = 2 + 3t \\ z = 2t \end{cases} \quad \text{and} \quad \begin{cases} x = -5 + 2t \\ y = 5 - 3t \\ z = 10 + 6t \end{cases}$$

- Find the distance between the point $(1, 2, 1)$ and the line $\begin{cases} x = 1 - 4t \\ y = 2 + 3t \\ z = 2t \end{cases}$

- Find the angle between the plane $2x - 3y + 2z = 6$ and the line $\begin{cases} x = 1 - 4t \\ y = 2 + 3t \\ z = 2t \end{cases}$

- A box is on the hillside as shown in the picture. The box weighs 45 pounds. The hillside makes an angle of 12° with the horizontal. If the x axis is horizontal and the y axis is vertical, write the vector that describes the projection of the weight onto the hillside.



- The crank on a bicycle is 12 inches long. The rider exerts a force of 60 pounds, straight down. Find the torque vector of the rider on center of the crank if the crank is at an angle of $\theta = 27^\circ$ above the positive y -axis. Use the coordinate system with the x -axis being perpendicular to the plane of your paper.
- A box weighing 400 pounds is at point P and is being held with three ropes. The tension in rope PC is 40 pounds. Using T_A and T_B for the tension ropes PA and PB , respectively, set up the system of equations that allows you to determine the tension in each rope. Do NOT SOLVE THE SYSTEM.

