

MA 242 Honors Test 1 Version 1

Put all of your answers in the blue book; answers written anywhere else won't be graded.

- (10 points) Find an equation of the set of all points equidistant from the xy -plane and z -axis. Describe the set.
- (12 points) A weight of 100 pounds hangs suspended by two cables. Each cable makes an angle of 30° with the ceiling as shown. Find the tension \vec{T} at each end of the cable.
- (10 points) Find the work done pulling a sled a distance of 12 m assuming the handle makes an angle 45° with the ground and you are using a constant force of 300N to pull the sled.
- (10 points) Determine whether or not the three given points lie on a single straight line. $P(0,-2,4)$, $Q(1,-3,5)$, $R(4,-6,8)$. Explain your reasoning.
- (15 points) a) Find the area of the triangle with vertices $P(1, 1, 0)$, $Q(1, 0, 1)$, and $R(0, 1, 1)$
b) Find the perimeter of the triangle from part a).
c) Find the equation of the plane which contains the triangle from part a).
- (15 points) The helix $\mathbf{r}_1(t) = \langle \cos t, \sin t, t \rangle$ intersects the curve $\mathbf{r}_2(t) = \langle (1+t), t^2, t^3 \rangle$ at the point $(1,0,0)$.
a) Find the angle of intersection of these curves.
b) Find parametric equations for the tangent line to $\mathbf{r}_1(t)$ at the point $(1,0,0)$
- (10 points) Find the arc length of the curve given by: $x = \frac{t^2}{2}$, $y = \ln(t)$, $z = t\sqrt{2}$ from $t = 1$ to $t = 2$.
- (10 points) Determine whether the two lines L_1 and L_2 are parallel, skew, or intersecting. If they intersect find the point of intersection.
 $L_1 : x = 6 + 2t, y = 5 + 2t, z = 7 + 3t$ and $L_2 : x = 7 + 3s, y = 5 + 3s, z = 10 + 5s$
- (8 points) Find the equation of the plane through $(5,7,-6)$ and parallel to the xz -plane