

Name: _____

Score: _____ /20

Lines and Planes

Please staple your work and use this page as a cover page.

1. Find an equation of the line that passes through the points $(1, 3, -1)$ and $(-2, -1, 5)$.
2. Find an equation of the plane that contains the point $(2, 1, -5)$ and is parallel to the plane with equation $4x - 12z = 7y + 2$.
3. Find all value(s) of t where the line $\vec{r}(t) = \langle 1 - t, t, t \rangle$ intersects the sphere $x^2 + y^2 + z^2 = 4$.
4. Are the planes $2x - y - z = 3$ and $2x + 2y + z = 1$ parallel, orthogonal, or neither? Be sure to justify your answer.
5. Do the four points $P(1, 1, 3)$, $Q(2, -4, -1)$, $R(2, 0, 2)$, and $S(3, -1, 1)$ all lie in a single plane? If so, find an equation of the plane, and if not, explain why not.
6. Find an equation of the plane that contains the line $\vec{r}(t) = \langle 4 - 2t, t, 5 - 4t \rangle$ and the point $(1, 1, 1)$.
7. Determine the equation of two planes whose intersection is the y -axis. Neither plane that you use can be the xy -plane or yz -plane.