

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has five (5) pages, including this one.
- You have fifty (50) minutes to complete the test.
- Enter your answer in the box(es) provided.
- You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
- Credit for each problem is given in parentheses at the right of the problem number.
- No books, notes or calculators may be used on this test.

Page	Max. points	Your points
2	30	
3	25	
4	25	
5	20	
Total	100	

Problem 1 (15 pts). Find the distance d from the point $(3, 7, -5)$ to the z -axis.

 $d =$

Problem 2 (15 pts). Find an exact expression for the angle θ between the vectors $\mathbf{v} = \langle 3, -1, 5 \rangle$ and $\mathbf{w} = \langle -2, 4, 3 \rangle$.

 $\theta =$

Problem 3 (15 pts). Find the length ℓ of the curve $\mathbf{r}(t) = \mathbf{i} + t^2\mathbf{j} + t^3\mathbf{k}$ for $0 \leq t \leq 1$.

 $\ell =$

Problem 4 (10 pts). At what points does the helix $\mathbf{r}(t) = \langle \sin t, \cos t, t \rangle$ intersect the sphere $x^2 + y^2 + z^2 = 5$?

points:

Problem 5 (15 pts). Find a unit vector \mathbf{v} that is orthogonal to both $\mathbf{i} + \mathbf{j}$ and $\mathbf{i} + \mathbf{k}$.

$\mathbf{v} =$

Problem 6 (10 pts). Determine whether the points $A = (0, -5, 5)$, $B = (1, -2, 4)$ and $C = (3, 4, 2)$ lie on a straight line.

Problem 7 (20 pts). Find parametric equations for the line of intersections of the planes $x+y+z = 1$ and $x + 2y + 2z = 1$. Find the angle θ between the two planes.

 $\theta =$