

Math 241, Fall 1999, exam 2

PRINT Your Name: _____

There are 10 problems on 5 pages. Each problem is worth 10 points. SHOW your work. **CIRCLE** your answer.

NO CALCULATORS!

- Graph $x^2 - y^2 = 1$ in 2-space.
- Graph $x^2 - y^2 = 1$ in 3-space.
- Graph and name $x^2 + y^2 = z$ in 3-space.
- (There is no partial credit for this problem. Make sure your answer is correct.)** Find the equation of the plane through $(1, 2, 2)$, $(1, 4, 5)$, and $(5, 5, 4)$.
- (There is no partial credit for this problem. Make sure your answer is correct.)** Find the equations of the line through $(5, 2, 4)$ and $(2, 4, 7)$.
- Do the following lines intersect? If so, find their point of intersection.

$$\frac{x+1}{-1} = \frac{y-10}{3} = \frac{z-10}{2} \quad \text{and} \quad \frac{x-4}{1} = \frac{y-5}{2} = \frac{z+8}{-6}$$

- Find the length of the curve
 $\vec{r}(t) = \sqrt{6}t^2 \vec{i} + \frac{2}{3}t^3 \vec{j} + 6t \vec{k}$ for $2 \leq t \leq 6$.
- What are the equations of the line tangent to the curve
 $\vec{r}(t) = (3t^2 + 2) \vec{i} + 4t \vec{j} + (4t^2 + 2t) \vec{k}$ at $t = 1$?
- Find the equations of **any** line which is contained on the plane $2x + 3y + z = 6$.
- Find the equation of **any** plane which contains the line

$$\begin{cases} x = 2 + 3t \\ y = 4 - 2t \\ z = 5 - 4t. \end{cases}$$