Math 225: Calculus III Name:________________________

Exam I *September 24, 1992* Section:________________________

Record your answers to the multiple choice problems by placing an $\times$ through one letter for each problem on this answer sheet. There are 15 multiple choice questions worth 6 points each. You start with 10 points.

Calculate the distance between the points $(2,1,-1)$ and $(5,3,-7)$. 7 $\sqrt{11}$ $\sqrt{62}$ $\sqrt{77}$ 6

Find the area of the parallelogram with vertices at the points $(0,0,0)$, $(3,1,2)$, $(1,-1,4)$, and $(4,0,6)$. 12.329 11.543 13.972 10.085 14.151

Which of the following vectors is perpendicular to $=3 \subset -2 \supset +5$. $3 \subset +2 \supset -$ $2 \subset -3 \supset$ $5 \subset +3 \subset + \supset -$ $\subset - \supset -6$

Find the projection of the vector $v = 5 \subset - \supset +3$ on the vector $w = \subset + \supset -$. $\frac{1}{3} \subset + \frac{1}{3} \supset - \frac{1}{3}$ $1 \subset + \supset -$ $5 \subset - \supset +3$ $\frac{5}{3} \subset - \frac{1}{3} \supset +$

Let $= -3 \subset + \supset +4$ and $=4 \subset -$. Compute $\times$-ı+ 13ȷ- 4-16-12ı- 44ı+16ȷ- 3ı+13ȷ-

Compute the volume of the box (parallelepiped) determined by the vectors $= \subset + \supset +$, $=2 \supset -$, and $=3 \subset + \supset$. 8 3 7 6 12

Find the point where the line $x = -7 + 2t$, $y = 8 - t$, $z = 3 + 5t$ intersects the plane $x - y + 2z = 4$. $(-5,7,8)$ $(-3,6,13)$ $(-9,9,11)$ $(-11,10,-2)$ $(1,4,7)$

Find the equation of the plane perpendicular to the line $x = 1 - t$, $y = 1 + 2t$, $z = -4t$ passing through the point $(1,1,1)$. $x - 2y + 4z = 3$ $x + y + z = 3$ $2x - y - 4z = -3$ $x + y = 2$ $-x + 2y + 4z = 0$

Calculate the distance from the point $(0,10,0)$ to the plane $x + y - z = 0$. 5.77 10.00 6.84 9.67 11.21

Determine the equation of the plane through the point $(2,1,0)$ that is parallel to the vectors $(-1,-1,2)$ and $(-2,1,1)$. $x + y + z = 3$ $x - y - z = 1$ $3x + 3y + z = 9$ $-3x + y - 3z = -5$ $3x - 3y + z = 3$

Find the equation of the line tangent to the curve $(t) = t^3 \subset -(t^2+1) \supset +e^{2t}$ at the point $(0,-1,1)$. $x = 0$, $y = -1$, $z = 1 + 2t$ $x = 0$, $y = 0$, $z = 2t$ $x = 3t^2$, $y = -2t$, $z = 2e^{2t}$ $x = 3t^2$, $y = -1 - 2t$, $z = 1 + 2e^{2t}$ $x = 3t$, $y = -1 - 2t$, $z = 1 + 2t$

Which of the following represents the curve traced by $(t) = t \subset +2\sin(t) \supset +3\cos(t)$, $0 \leq t \leq 6\pi$?

A particle's velocity is given by $\check{(}t) = -t^2 \subset +t \supset +,\ t \geq 0$. If the particle is at the point $(1, 2, 0)$ at time $t = 1$, where is it at time $t = 2$? $(-\frac{4}{3}, \frac{7}{2}, 1)$ $(-\frac{8}{3}, 2, 2)$ $(\frac{2}{3}, \frac{5}{2}, 1)$ $(-\frac{5}{3}, 4, 2)$ $(-\frac{1}{3}, \frac{1}{2}, 0)$

Calculate the length of the curve $(t) = 3t \subset +t^2 \supset +\frac{4}{3}\sqrt{3}t^{3/2}$ from $t = 0$ to $t = 3$. 18 16 14 12 9

Find the unit normal vector (t) to the curve $(t) = 2\cos(t) \subset -2\sin(t) \supset +\sqrt{5}t$. $(t) = -\cos(t) \subset +\sin(t) \supset$ $(t) = -\frac{2}{3}\cos(t) \subset +\frac{2}{3}\sin(t) \supset +\frac{\sqrt{5}}{3}$ $(t) = -\frac{2}{3}\sin(t) \subset -\frac{2}{3}\cos(t) \supset +\frac{\sqrt{5}}{3}$ $(t) = \frac{-2\sin(t)\subset -2\cos(t)\supset}{\sqrt{2\sin(t)+2\cos(t)+\sqrt{5}}}$ $(t) = \frac{-2\cos(t)\subset -2\sin(t)\supset +\sqrt{5}}{\sqrt{2\cos(t)+2\sin(t)+\sqrt{5}}}$