DEPARTMENT OF MATHEMATICS UNIVERSITY OF KANSAS

Midterm Exam

MATH 122 Spring 2014

Your Name: _____

KUID Number: _____

1	(20)	_____
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Total	(200)	_____

1	(10)	_____
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3	(10)	_____
4	(10)	_____

Some useful formulas

To be filled

Multiple choice questions

(1) Let $b =< 2, 0, 1 >$, $a =< 1, 0, -3 >$. Find $proj_a b$.
(A)
(B)
(C)
(D)

(2) Find $< 1, 1, -2 > \times < 3, -2, 1 >$
(A)
(B)
(C)
(D)

(3) Find the sum of the series

$$\sum_{n=1}^{\infty} \frac{1}{n(n+2)}$$

(A)
(B)
(C)
(D)

(4) Find the angle between the planes $2x + y + z = 1$, $2x - y + 2z = 1$.

(A)
(B)
(C)
(D)

(5) Expand the function

$$f(x) = \sin(x)$$

in Taylor series around the point $a = \pi/2$.

(6) Determine the interval of convergence for the power series

$$\sum_{n=0}^{\infty} \frac{2^n (x-3)^n}{\sqrt{n+3}}.$$

(7) Find the points on the curve $r = 1-\sin(\theta)$, where the tangent line is horizontal or vertical.

(8) Find the exact length of the polar curve $r = \sin(\theta), 0 \leq \theta \leq \pi/3$.

(9) Find the volume of the parallelepiped spanned on the vectors $\vec{a} = \mathbf{i} + \mathbf{j} - 2\mathbf{k}$, $\vec{b} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k}$, $\vec{c} = \mathbf{j} - 5\mathbf{k}$

(10) Find the equations of the plane passing through the origin and the points $P(2, -4, 6)$ and $Q = (5, 1, 3)$.

(11) Find the line of intersection of the planes $2x - y + z = 2$, $3x - 2y + z = 1$.

(12) Find the plane that passes through the point $P(1, -1, 1)$ and contains the line $x = 2y = 3z$.