

DEPARTMENT OF
MATHEMATICS
UNIVERSITY OF KANSAS

Midterm Exam

MATH 122 Spring 2014

Your Name: _____

KUID Number: _____

1 (20) _____

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5 (20) _____

1 (10) _____

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8 (20) _____

4 (10) _____

Total (200) _____

Some useful formulas

To be filled

Multiple choice questions

(1) Let $b = \langle 1, 0, 4 \rangle$, $a = \langle 2, 0, -1 \rangle$. Find $\text{proj}_a b$.

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

(2) Find $\langle 2, 3, 1 \rangle \times \langle 1, 0, 5 \rangle$

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

(3) Find the sum of the series

$$\sum_{n=1}^{\infty} \frac{(-1)^n \pi^n}{3^{2n} (2n)!}.$$

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

(4) Find the distance from the point $P(1, 3, 2)$ to the plane $2x + 3y - 4z = 1$.

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

- (5) Find the Maclaurin series for the function

$$f(x) = \ln(4 - x).$$

Determine the interval of convergence.

- (6) Find the sum of the series

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{n^6},$$

within two decimals. Justify your answer.

- (7) Find the area inside $r = 3\cos(\theta)$, which is outside $r = 1 + \cos(\theta)$.

Remark: Here you will normally be supplied with a picture.

- (8) Find the length of the curve $r = \theta^2, 0 \leq \theta \leq 2\pi$.

- (9) A woman walks west on the deck of a ship at 3 mph. The ship is moving north at 22 mph. Find the speed and the direction of the woman.

- (10) Find the angle between the planes $2z = 4y - x$ and $3x - 12y + 6z = 1$.

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

(12) Find the equation of the plane that passes through the point $P(1, 5, 1)$ and is perpendicular to the planes $2x + y - 2z = 2$, $x + 3z = 4$.