

# Math 2300 Honors - Midterm 1 Review Questions

Fall 2012

October 3, 2012

## Question 1

The equation  $r = 7$  in polar coordinates is a...

- A. line
- B. circle
- C. ellipse
- D. cardioid
- E. rose

## Question 2

The equation  $r = 7 / \cos(\theta)$  in polar coordinates is a...

- A. line
- B. circle
- C. ellipse
- D. cardioid
- E. rose

## Question 3

The equation  $r = 7 \cos(\theta)$  in polar coordinates is a...

- A. line
- B. circle
- C. ellipse
- D. cardioid
- E. rose

## Question 4

The equation  $r = \cos(7\theta)$  in polar coordinates is a...

- A. line
- B. circle
- C. ellipse
- D. cardioid
- E. rose

## Question 5

Which of the following integrals will converge?

A.  $\int_0^{\infty} x^{-1} dx$

B.  $\int_0^{\infty} x^{-2} dx$

C.  $\int_1^{\infty} x^1 dx$

D.  $\int_1^{\infty} x^{-2} dx$

E.  $\int_0^7 x^{-2} dx$

## Question 6

If  $\int_1^{\infty} f(x) dx$  converges, which of the following may still diverge?

A.  $\int_1^{\infty} 2f(x) dx$

B.  $\int_1^{100} f(x)^2 dx$

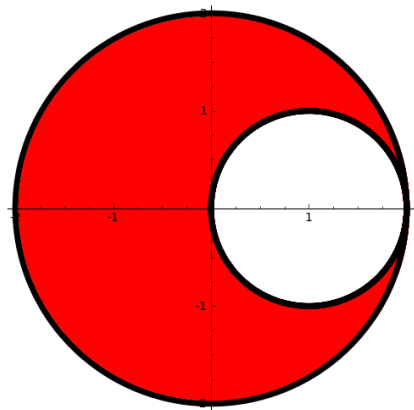
C.  $\int_1^{\infty} f(2x) dx$

D.  $\int_0^{\infty} f(x) dx$

E.  $\int_1^{\infty} f(x+2) dx$

## Question 7

Where should the center of mass of the red shape be?



- A.  $(0, 0)$
- B.  $(1, 0)$
- C.  $(-1/3, 0)$
- D.  $(-1/4, 0)$
- E.  $(-1, 0)$



## Question 8

To find the volume of a cone (with base on the  $xy$  plane), which do you think will be easiest?

- A. slices  $x = \text{constant}$
- B. slices  $y = \text{constant}$
- C. slices  $z = \text{constant}$
- D. cylindrical shells (cylinder along  $z$  axis)
- E. cylindrical shells (cylinder along  $y$  axis)

## Question 9

To find the volume of a square pyramid (base flat on the  $xy$  plane), which do you think will be easiest?

- A. slices  $x = \text{constant}$
- B. slices  $y = \text{constant}$
- C. slices  $z = \text{constant}$
- D. cylindrical shells (cylinder along  $z$  axis)
- E. cylindrical shells (cylinder along  $y$  axis)

## Question 10

To find the volume of a torus (lying flat on top of the  $xy$  plane), which do you think will be easiest?

- A. slices  $x = \text{constant}$
- B. slices  $z = \text{constant}$
- C. cylindrical shells (cylinder along  $z$  axis)
- D. cylindrical shells (cylinder along  $x$  axis)
- E. to switch to sociology

## Question 11

Which of the following integrals gives the area of a unit circle?

A.  $\int_{-1}^1 \sqrt{1-x^2} dx$

B.  $\int_0^2 2\sqrt{1-(x-1)^2} dx$

C.  $\int_0^{2\pi} 1 d\theta$

D.  $\int_0^{2\pi} \pi r^2 dr$

E.  $\int_0^1 2\pi r dr$

## Question 12

Which of the following is the relationship between the height  $h$  and radius  $r$  of the circular slices of a cone (measuring height from the tip)? The cone has base radius  $b$  and height  $a$ .

A.  $r = h$

B.  $r = bh/a$

C.  $r = ah/b$

D.  $r = (h - a)/b$

E.  $r = (h - b)/a$

# Answers

1. B
2. A
3. B
4. E
5. D
6. B and D
7. C
8. C or D (matter of opinion)
9. C (matter of opinion)
10. B or C (matter of opinion)
11. B and E
12. B