

Show all work. **Circle your answer.**

No books, no notes, no calculator, no cell phones, no pagers, no electronic devices at all.

Solutions will be posted shortly after the exam: [www.math.wisc.edu/~miller/m217](http://www.math.wisc.edu/~miller/m217)

Name\_\_\_\_\_

**Hand in to your TA – Circle your DIScussion section (column one):**

|         |           |                |                        |
|---------|-----------|----------------|------------------------|
| DIS 321 | 7:45 TR   | 901 Van Vleck  | Forray, Susan Jane     |
| DIS 322 | 8:50 TR   | 6224 Soc Sci   | Bisgard, James William |
| DIS 324 | 9:55 TR   | 123 Ingraham   | Bisgard, James William |
| DIS 326 | 11:00 TR  | B235 Van Vleck | Leete, Jennifer A.     |
| DIS 327 | 11:00 TR  | 113 Ingraham   | Lu, Tianshi            |
| DIS 328 | 12:05p TR | B235 Van Vleck | Leete, Jennifer A.     |
| DIS 329 | 12:05p TR | 6228 Soc Sci   | Lu, Tianshi            |
| DIS 330 | 1:20p TR  | B321 Van Vleck | Forray, Susan Jane     |
| DIS 332 | 2:25p TR  | B135 Van Vleck | Hur, Youngmi           |
| DIS 334 | 3:30p TR  | B329 Van Vleck | Hur, Youngmi           |

| Problem | Points | Score |
|---------|--------|-------|
| 1       | 10     |       |
| 2       | 10     |       |
| 3       | 10     |       |
| 4       | 10     |       |
| 5       | 10     |       |
| 6       | 10     |       |
| Total   | 60     |       |

1. (10 pts) Find the value of

$$\cos(12^\circ) \cos(-18^\circ) + \sin(18^\circ) \sin(-12^\circ)$$

and simplify it.

Circle your answer.

2. (10 pts) Find  $\sin^2(\frac{\theta}{2})$  given that  $\cos(\theta) = \frac{4}{5}$ .  
Circle your answer.

3. (10 pts) Find all  $\theta$  which solve the equation:

$$2\sin(\theta)\cos(\theta) + 2\sin(\theta) + \cos(\theta) + 1 = 0$$

Circle your answer.

4. (10 pts) Suppose  $z = \tan(\theta) \sec(\theta)$ .

Find  $\frac{dz}{d\theta}$ .

Simplify and express in terms of  $\sec(\theta)$  only.

Circle your answer.

5. (10 pts) Find the value of

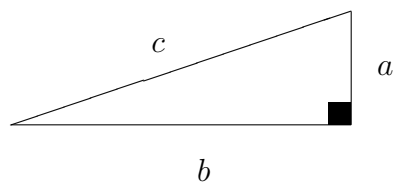
$$\int_0^2 \frac{dx}{1 + \frac{x^2}{4}}$$

and simplify.

Circle your answer.

6. (10 pts) Prove Pythagorus's Theorem. In a right triangle with hypotenuse  $c$  and sides  $a$  and  $b$ , we have that

$$a^2 + b^2 = c^2$$



## Answers

1.  $\cos(30^\circ) = \frac{\sqrt{3}}{2}$

2.  $\frac{1}{10}$

3.

$\theta = \pi + 2\pi n$  or

$\theta = -\frac{\pi}{6} + 2\pi n$  or

$\theta = -\frac{5\pi}{6} + 2\pi n$

for  $n = 0, 1, -1, 2, -2, \dots$ 

4.  $2 \sec^3(\theta) - \sec(\theta)$

5.  $\frac{\pi}{2}$

6. After removing the triangles the remaining areas must be equal. (I would have shaded the triangles but my computer program wasn't up to it.)

