Math 152 Sec S07N01 Test 2 – Mar 8 2007

name (printed)

student number

I have read and understood the instructions below:

signature

Instructions:

1. No notes or books are to be used in this test. If you need scrap paper please ask and some will be provided. Refer to the last page for a list of formulas.
2. A non-programmable, non-graphing calculator is permitted.
3. There are 7 pages (including this cover page) in the test. Justify every answer, and clearly show your work. Unsupported answers will receive no credit.
4. You will be given 50 minutes to write this test. Read over the test before you begin.
5. At the end of the test you will be given the instruction "Put away all writing implements and remain seated." *Continuing to write after this instruction will be considered as cheating.*
6. **Academic dishonesty:** Exposing your paper to another student, copying material from another student, or representing your work as that of another student constitutes academic dishonesty. Cases of academic dishonesty may lead to a zero grade in the test, a zero grade in the course, and other measures, such as suspension from this university.

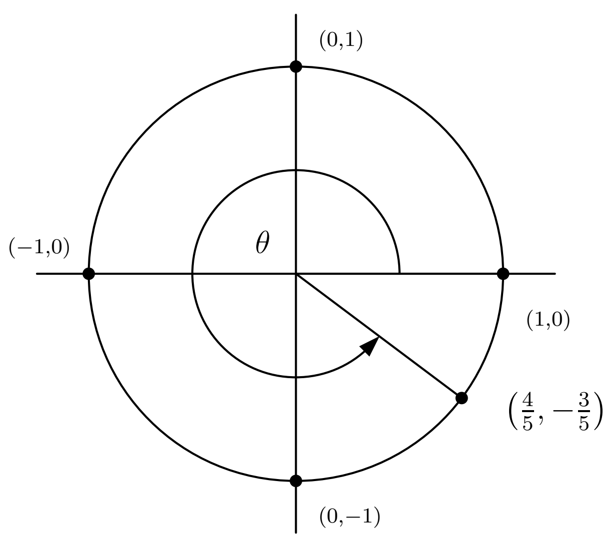
Question	value	score
1	10	
2	10	
3	10	
4	10	
5	10	
Total	**50**	

Question 1:

(a)[3 points] Convert $-2\pi/5$ radians to degrees.

(b)[3 points] A right triangle has acute angles α and β. If $\tan\alpha = \dfrac{3}{4}$, what is $\csc\beta$.

(c)[4 points] Referring to the unit circle below, find the exact numerical value of $\tan(\theta + \pi)$.



Question 2

(a)[**7 points**] Neatly sketch the graph of $y = 1 + 2\sin(4x + \pi)$, showing at least two complete cycles of the function.

(b)[**3 points**] State the period, amplitude and phase shift of the function in part (a).

Question 3

(a)[**2 points**] Find the exact value of $\sec\left(\frac{17\pi}{4}\right)$.

(b)[**3 points**] Express $\sin\left(\tan^{-1}(x/3)\right)$ in terms of x (without trig functions).

(c)[**3 points**] Use trigonometric identities to find the exact value of $\cos\left(\frac{5\pi}{12}\right)$. (Hint: $\frac{1}{6}+\frac{1}{4}=\frac{5}{12}$.)

(d)[**2 points**] Use (c) to find $\cos\left(\frac{5\pi}{24}\right)$.

Question 4 [10 points]
An observer standing at the top of a tower is looking down at a nearby tree. The tower and tree are on level ground, and the observer's eyes are 20 m above the ground. The observer's line of sight to the top of the tree has an angle of depression of $40°$, while the line of sight to the base of the tree has an angle of depression of $55°$. How tall is the tree?

Question 5

(a)[**5 points**] Simplify

$$(\sin x + \cos x)^2 - \sin(2x)$$

(b)[**5 points**] Find all solution in $[0, 2\pi)$ of

$$3\cos x - 2\cos^2 x = 1$$

You may find some of the following formulas useful:

$$\sin^2(A) + \cos^2(A) = 1$$

$$\sin(A+B) = \sin(A)\cos(B) + \cos(A)\sin(B)$$

$$\sin(A-B) = \sin(A)\cos(B) - \cos(A)\sin(B)$$

$$\cos(A+B) = \cos(A)\cos(B) - \sin(A)\sin(B)$$

$$\cos(A-B) = \cos(A)\cos(B) + \sin(A)\sin(B)$$

$$\sin(2A) = 2\sin(A)\cos(A)$$

$$\cos(2A) = \cos^2(A) - \sin^2(A)$$

$$\cos(2A) = 1 - 2\sin^2(A)$$

$$\cos(2A) = 2\cos^2(A) - 1$$

$$\sin(A/2) = \pm\sqrt{\frac{1-\cos(A)}{2}}$$

$$\cos(A/2) = \pm\sqrt{\frac{1+\cos(2A)}{2}}$$