College of Industrial Technology

King Mongkut's University of Technology North Bangkok

Final Examination of Semester 1 **Year:** 2012

Subject: 394171 Mathematics I **Section:** 15 - 16

Date: 27 September 2012 **Time:** 13.00-16.00

Name: _____ **ID:** _____ **Field of Study:** _____

Instructions :

1. Cheating will result in failure of all classes registered for the current semester. Students who are caught cheating will also be denied registering for the following semester.
2. No documents are allowed to be taken out of the examination room.
3. Textbooks are **NOT** allowed.
4. Calculator devices and dictionary are **NOT** allowed.
5. No any electronic communication devices allow in the exam room.
6. The examination has 7 pages (including this page), 21 questions and 2 parts. The total score is 45 points.
   Part I : Determine whether the statement is true or false.
   There are 5 questions for 5 points.
   Part II : Multiple choices. There are 21 questions for 42 points.
7. Write all your answers on this exam sheet.

Part I (5 points)

Determine whether the statement is true or false. If false, describe how the statement might be changed to make it ture.

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

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

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.....(3) $\sin 2A = \dfrac{1 - \tan^2 A}{1 + \tan^2 A}$

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............(4) $\cos\frac{A}{2} = \sqrt{\frac{1+\cos x}{2}}$

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............(5) $2\sin A \sin B = \cos(A + B) + \cos(A - B)$

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<u>Part II</u> (42 points)

Choose the best answer for each of the following problems.

1. Which quadrant contain radian of $\frac{5p}{3}$?

   A. Quadrant 1 B. Quadrant 2 C. Quadrant 3 D. Quadrant 4

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2. What is -72° for radian measure ?

   A. $\frac{8p}{5}$ B. $-\frac{5p}{6}$ C. $\frac{3p}{8}$ D. $\frac{2p}{5}$

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3. What is $\frac{5p}{9}$ for degree measure ?

   A. 100° B. 200° C. -100° D. No correct answer

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4. Determine $\sin(-\frac{5p}{6}) + \tan\frac{p}{3}\cos(-\frac{p}{2}) - \cot\frac{5p}{6}\sec(-\frac{7p}{6})$?

   A. $-\frac{5}{2}$ B. $\frac{5}{2}$ C. $-\frac{3}{2}$ D. $\frac{3}{2}$

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5. Determine cosec 15° = ?

A. $\sqrt{6} + \sqrt{2}$ B. $\sqrt{2} - \sqrt{6}$ C. $\frac{\sqrt{6} - \sqrt{2}}{4}$ D. $\frac{\sqrt{6} + \sqrt{2}}{4}$

6. Given that $\sin A = \frac{3}{5}$, $0 < A < \frac{p}{2}$ and $\sin B = -\frac{8}{17}$, $\frac{3p}{2} < B < 2\pi$.

Find $\tan(A - B) = ?$

A. $\frac{85}{77}$ B. $\frac{77}{36}$ C. $\frac{13}{84}$ D. undefined

7. Evaluate that $\sin 20° (1 + 2\cos 40°)$

A. $\frac{1}{\sqrt{2}}$ B. $\frac{1}{2}$ C. $\frac{\sqrt{3}}{2}$ D. 1

8. Determine $1 + \cos 70° + 2\sin^2 35°$

A. 0 B. 1 C. 2 D. undefined

9. If $\frac{3p}{2} < A < 2\pi$ and $\tan A = -\frac{3}{4}$. Find the value $\sin\frac{A}{2}$?

A. $\frac{1}{\sqrt{10}}$ B. $-\frac{1}{\sqrt{10}}$ C. $\frac{3}{\sqrt{10}}$ D. $-\frac{3}{\sqrt{10}}$

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10. Find $\cos^2\theta - \sin^2\theta$ = ?

A. $1 - 2\sin^2\theta$ B. $1 + 2\sin^2\theta$ C. $1 - 2\cos^2\theta$ D. $1 + 2\cos^2\theta$

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11. Determine the value of $\frac{1+\cos x}{\sin x} + \frac{\sin x}{1+\cos x}$ = ?

A. 1 B. $1 + \cos x + \sin x$ C. $2\csc x$ D. $2\sec x$

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12. Find the value of $\cos 70° + \cos 50° - \cos 10°$.

A. 0 B. $\frac{1}{2}$ C. 1 D. $2\cos 10°$

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13. Given that $\frac{\sin(A - B)}{\sin(A + B)} = \frac{5}{7}$ and $\tan A = k \tan B$, find the value of k.

A. 5 B. 6 C. 7 D. 8

14. Which expression equivalent to $\sin 6t \cos 5t$?

A. $\frac{1}{2}\sin t + \frac{1}{2}\sin 11t$ B. $\frac{1}{2}\cos t + \frac{1}{2}\cos 5t$

C. $\frac{1}{2} + \frac{1}{2}\cos 4t$ D. $\frac{1}{2}\cos 2t + \frac{1}{8}\cos 4t$

15. What is the value of t satisfying $2\sin^2 t + \sin t - 1 = 0$.

A. $\frac{p}{2}$ B. $\frac{p}{3}$ C. $\frac{2p}{3}$ D. $\frac{5p}{6}$

16. Find the value of $\sin(\cot^{-1}(-\sqrt{3}))$

A. $\frac{\sqrt{3}}{2}$ B. $\frac{1}{2}$ C. $-\frac{\sqrt{3}}{2}$ D. $-\frac{1}{2}$

17. Let $0 \le \theta \le \frac{p}{2}$. Find $\sec\theta$ which satisfy that $2\tan^2\theta - \sec\theta = 1$.

A. $\frac{3}{2}$ B. $\frac{3}{\sqrt{5}}$ C. $\frac{2}{3}$ D. $\frac{\sqrt{5}}{3}$

18. If $y = \frac{1}{2}\cos(\pi + 2x)$, what is the period of the graph ?

A. $\frac{p}{2}$ B. π C. $\frac{3p}{2}$ D. 2π

19. What is the amplitude of $y = -\frac{3}{2}\cos(5x + \frac{p}{2})$?

A. -1.5 B. 1.5 C. $\frac{3}{4}$ D. $-\frac{3}{4}$

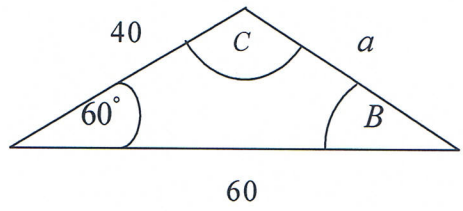
20. Find a^2 = ? (Use cosine combination formula)

A. $5200 + 2400\sqrt{3}$

B. $5200 - 2400\sqrt{3}$

C. 6400

D. 2800



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21. A climber who wants to measure the height of a cliff is standing 35 feet from the base of the cliff. An angle of approximately 60°is formed by the lines joining the climber's feet with the top and bottom of the cliff, use this information to approximate the height of the cliff.

A. $35\sqrt{2}$ B. $70\sqrt{2}$ C. $35\sqrt{3}$ D. $70\sqrt{3}$

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