Instructions:

(1) You must use a #2 pencil on the answer sheet.

(2) Fill in and bubble your name, PUID, and section number on the answer sheet.

(3) Make sure that the cover of this exam matches the color of your answer sheet.

(4) There are 15 questions. On the answer sheet, blacken your choice of the correct answer in the spaces provided for questions 1-15. Do all of your work on the question sheets. Turn in the answer sheet when you leave and keep the question sheets. Only the answer sheet will be graded.

(5) All questions are worth the same. Please answer every question.

(6) **PDA's and cell phones, must turned off, put away, and out of sight.** No books or papers are allowed.

(7) **A one-line calculator may be used where appropriate.**

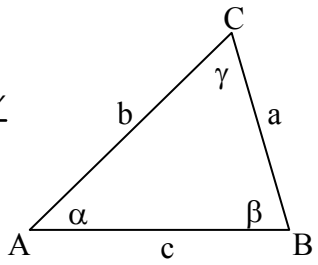
(8) The exam is self-explanatory. Do not ask questions about any of the exam problems.

(9) Exam answers will be available on the course web page one hour after the exam ends.

(10) Exam scores will be posted from a link on the MA 154 Course Page and on Blackboard in a few days. PLEASE check your exam score online before the next exam.

LAW OF SINES

$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$$



LAW OF COSINES

$$c^2 = a^2 + b^2 - 2ab\cos\gamma$$

ANGLE BETWEEN TWO VECTORS: $\cos\theta = \dfrac{(\vec{a})\bullet(\vec{b})}{\|\vec{a}\|\,\|\vec{b}\|}$

MA 15400 Exam 3 Spring 2009

This exam covers Sections 7.6 (starting at question #53), 8.1, 8.2, 8.3, and 8.4

1. Given ΔABC with angle $\alpha = 22°$, angle $\gamma = 59°$, and side $b = 15.0$, find the length of side c to the nearest tenth.

   A. 13.0

   B. 5.7

   C. 13.9

   D. 10.9

   E. None of the above

2. If $a = i - 3j$ and $b = -7i + 4j$, find $2a - 5b$.

   A. $16i + 14j$

   B. $-12i - 26j$

   C. $37i - 26j$

   D. $-33i + 14j$

   E. None of the above

3. Find the perimeter of ΔABC, to the nearest centimeter, given angle α = 56.6º, side b = 14.1 cm, and side a = 17.8 cm.

   A. 50 cm

   B. 53 cm

   C. 42 cm

   D. 56 cm

   E. None of the above

This exam covers Sections 7.6 (starting at question #53), 8.1, 8.2, 8.3, and 8.4

4. The bearing from point A to point B is N59ºW. The bearing from point A to point C is N42ºE. The distance from A to B is 300 miles and the distance from B to C is 450 miles. How far is it from A to C. Approximate your answer to the nearest mile.

   A. 279 miles

   B. 226 miles

   C. 335 miles

   D. 251 miles

   E. None of the above

5. Given ΔABC with side $a = 29.2$, side $b = 28.1$, and side $c = 19.8$, find the value of the largest angle in the triangle to the nearest tenth of a degree.

   A. 113.2º

   B. 66.8º

   C. 107.2º

   D. 72.8º

   E. None of the above

6. Find the angle between the two vectors $a = \langle 5, 8 \rangle$ and $b = \langle -10, 1 \rangle$.

   A. 116.3º

   B. 63.7º

   C. 71.6º

   D. 108.4º

   E. None of the above

This exam covers Sections 7.6 (starting at question #53), 8.1, 8.2, 8.3, and 8.4

For Questions 7 and 8: The magnitude and direction of two forces acting at a point P are 130 lb at 210º and 200 lb at 100º.

7. What is the magnitude of the resulting vector to the nearest tenth of a pound?

A. 192.3 lb

B. 197.8 lb

C. 181.3 lb

D. 186.8 lb

E. None of the above

8. What is the direction of the resulting vector to the nearest tenth of a degree?

A. 126.6º

B. 163.4º

C. 138.1º

D. 151.9º

E. None of the above

This exam covers Sections 7.6 (starting at question #53), 8.1, 8.2, 8.3, and 8.4

9. Find the vector of **magnitude 4** that has the **opposite** direction as the vector $a = \langle 5, -6 \rangle$

A. $\langle -20, 24 \rangle$

B. $\left\langle \frac{20}{\sqrt{61}}, \frac{-24}{\sqrt{61}} \right\rangle$

C. $\langle 20, -24 \rangle$

D. $\left\langle \frac{-20}{\sqrt{61}}, \frac{24}{\sqrt{61}} \right\rangle$

E. None of the above

10. Given vector $c = -4i + 8j$, find the smallest positive angle θ, from the positive x-axis to c, to the nearest tenth of a degree.

A. $\theta = 116.6°$

B. $\theta = 125.4°$

C. $\theta = 144.5°$

D. $\theta = 153.4°$

E. None of the above

This exam covers Sections 7.6 (starting at question #53), 8.1, 8.2, 8.3, and 8.4

11. A ship leaves port at 1:00 and travels in the direction N42°W at a rate of 25 miles per hour. A second ship leaves the same port at the same time and travels in the direction S10°W at a rate of 32 miles per hour. To the nearest mile, how far apart are the two ships at 3:00 PM?

A. 79 miles

B. 103 miles

C. 92 miles

D. 81 miles

E. None of these.

12. Determine m such that the two vectors are orthogonal.

$a = 4mi - 9j,\ b = 6i + 8j$

A. $m = -3$

B. $m = \frac{4}{3}$

C. $m = 3$

D. $m = \frac{-4}{3}$

E. None of these.

13. An airplane with airspeed of 300 mi/hr is flying in the direction 66°, and a 50 mi/hr wind is blowing in the direction of 144°. Approximate, to the nearest mi/hr, the ground speed of the plane.

A. 304 mi/hr

B. 294 mi/hr

C. 299 mi/hr

D. 314 mi/hr

E. None of the above

This exam covers Sections 7.6 (starting at question #53), 8.1, 8.2, 8.3, and 8.4

14. Approximate the solutions of the equation, to four decimals, in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$.

$$4\tan^2 x - \tan x - 1 = 0$$

A. $0.37820, 2.7512$

B. $0.6404, -0.3904$

C. $3.7112, 2.7694$

D. $0.5696, -0.3722$

E. None of the above

15. Approximate the solutions of the equation, to four decimals, in the interval $(0, 2\pi)$.

$$(\cos x)(2\cos x + 3) = 1$$

A. $1.8554, 4.4278$

B. $1.2862, 4.9970$

C. $0, 3.1416$

D. $0.2808, 6.0024$

E. No solution

This exam covers Sections 7.6 (starting at question #53), 8.1, 8.2, 8.3, and 8.4

Question	Answer	Letter
1.	13.0	A
2.	$37i - 26j$	C
3.	53 cm	B
4.	283 miles	E
5.	72.8□	D
6.	116.3□	A
7.	197.8 lb	B
8.	138.1□	C
9.	$\left\langle \frac{-20}{\sqrt{61}}, \frac{24}{\sqrt{61}} \right\rangle$	D
10.	$\theta = 116.6°$	A
11.	103 miles	B
12.	$m = 3$	C
13.	314 mi/hr	D
14.	$0.5696, -0.3722$	D
15.	$1.2862, 4.9970$	B