

This exam covers all of Sections 8.1, 8.2, 8.3, and 4.5

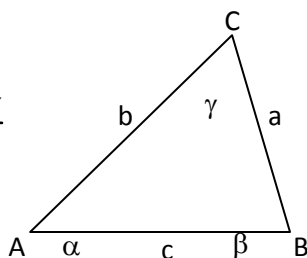
Name: _____

Instructions:

- (1) You must use a #2 pencil on the answer sheet.
- (2) On the answer sheet, fill in: **(This has to be correct to find your score online.)**
 - a) Your last name, first name and middle initial **and** blacken the appropriate spaces.
 - b) Your division and section number **and** blacken the appropriate spaces.
 - c) Your 10-digit student identification number **and** blacken the appropriate spaces.
 - d) Leave the test/quiz number blank.
 - e) Sign your name at the bottom of the answer sheet.
- (3) Make sure that the cover of this exam matches the color of your answer sheet. If you are color blind, ask the person sitting next to you for assistance.
- (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. No points will be deducted for wrong answers.
- (6) PDA's, cell phones, and pagers must turned off, put away, and out of sight. No books or papers are allowed.
- (7) A one-line calculator may be used. No other calculator is allowed.
- (8) The exam is self-explanatory. Do not ask questions about any of the exam problems.
- (9) Exam answers will be emailed to all students about an hour after the exam ends. They will also be posted on the MA 154 webpage by noon the day after the exam. Exam scores will be posted online by noon on the second day after the exam. Log into Blackboard to find your exam score. 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

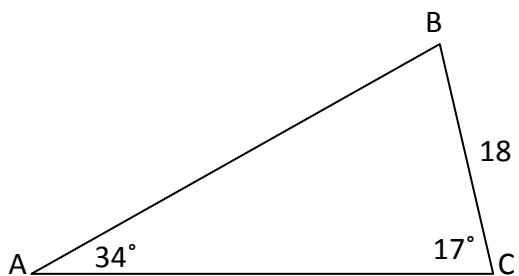
$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$

ANGLE BETWEEN TWO VECTORS:

$$\cos \theta = \frac{(\vec{a}) \cdot (\vec{b})}{\|\vec{a}\| \|\vec{b}\|}$$

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1. Find the perimeter of the given triangle.



- A. 57.8
- B. 48.9
- C. 63.7
- D. 52.4
- E. None of the above

2. Given $\triangle ABC$ with angle $\alpha = 13^\circ$, side $b = 75$, and side $c = 105$, find angle γ rounded to the nearest tenth of a degree.

- A. 126.1°
- B. 40.9°
- C. 27.9°
- D. 139.1°
- E. None of the above

3. A ship leaves port at 1:00 pm traveling at 20 mph in the direction $N34^\circ E$. At 2:00 pm, a second ship leaves the same port traveling at 15 mph in the direction $S17^\circ E$. To the nearest mile, how far apart are the two ships at 5:00 pm.

- A. 114 miles
- B. 92 miles
- C. 62 miles
- D. 103 miles
- E. None of the above

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4. To find the distance from Point A to Point B, Tim finds Point C that is 100 meter from Point B. He then find the measures of Angle B = 62° and Angle C = 31° . Find the distance from Point A to Point B to the nearest tenth of a meter.
- A. 140.9 meters
 - B. 75.3 meters
 - C. 51.6 meters
 - D. 68.7 meters
 - E. None of the above
5. Given vectors $a = 3i + 4j$ and $b = -5i + 7j$, find $5a - 4b$.
- A. $-24i - 15j$
 - B. $-5i + 48j$
 - C. $50i + 4j$
 - D. $45i - 9j$
 - E. None of the above
6. Find the magnitude of vector $a = \langle -4, -5 \rangle$, and the smallest positive angle θ between the positive x -axis and the vector a . Round both answers to one decimal place.
- A. $\|a\| = 6.4, \theta = 231.3^\circ$
 - B. $\|a\| = 6.4, \theta = 218.7^\circ$
 - C. $\|a\| = 3.0, \theta = 231.3^\circ$
 - D. $\|a\| = 3.0, \theta = 218.7^\circ$
 - E. None of the above

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7. To the nearest tenth, approximate the magnitude of the resultant force if vectors $a = 7.8 \text{ lb.}$ and $b = 9.9 \text{ lb.}$ represent two forces acting at one point and the angle between a and b is 71° .
- A. 10.4 lb
B. 16.7 lb
C. 14.5 lb
D. 12.6 lb
E. None of the above
8. An airplane with airspeed of 200 mph is flying in the direction 120° and a 40 mph wind is blowing directly from the west. Approximate the true course and ground speed to the nearest tenth.
- A. $\text{true course} = 115.1^\circ$
 $\text{ground speed} = 164.5 \text{ mph}$
B. $\text{true course} = 115.1^\circ$
 $\text{ground speed} = 235.5 \text{ mph}$
C. $\text{true course} = 110.2^\circ$
 $\text{ground speed} = 164.5 \text{ mph}$
D. $\text{true course} = 110.2^\circ$
 $\text{ground speed} = 235.5 \text{ mph}$
E. None of the above

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9. Find a vector of magnitude 7 that has the **opposite** direction of vector $a = -3i + 8j$.

A. $\frac{21}{\sqrt{73}}i - \frac{56}{\sqrt{73}}j$.

B. $21i - 56j$.

C. $\frac{-21}{\sqrt{73}}i + \frac{56}{\sqrt{73}}j$.

D. $-21i + 56j$.

E. None of the above

10. Find a unit vector that has the **same** direction as vector $b = \langle 9, -4 \rangle$.

A. $\left\langle \frac{-9}{\sqrt{97}}, \frac{4}{\sqrt{97}} \right\rangle$

B. $\left\langle \frac{9}{\sqrt{65}}, \frac{-4}{\sqrt{65}} \right\rangle$

C. $\left\langle \frac{-9}{\sqrt{65}}, \frac{4}{\sqrt{65}} \right\rangle$

D. $\left\langle \frac{9}{\sqrt{97}}, \frac{-4}{\sqrt{97}} \right\rangle$

E. None of the above

11. Given $a = 2i - 6j$, $b = 3i + 5j$, and $c = -i + 4j$, find $(2a + b) \cdot 3c$

A. -95

B. -105

C. -85

D. -80

E. None of the above.

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12. Given $f(x) = \frac{x^2 + x - 6}{3x^2 + 3x - 6}$ which of the following statements(s) is/are true?

- I. The horizontal asymptote is $y = 0$
- II. The y -intercept is -1
- III. There are two x -intercepts
- IV. The vertical asymptotes are $x = 1$ and $x = -2$

- A. None of the statements are true.
- B. Only one of the statements is true.
- C. Only two of the statements are true.
- D. Only three of the statements are true.
- E. All of the statements are true.

13. Find the function in x that satisfies the following conditions.

Vertical asymptotes: $x = 1, x = -3$
Horizontal Asymptote: $y = 5$
 x -intercept: $-4, 6$

A. $f(x) = \frac{5(x+4)(x-6)}{(x-1)(x+3)}$

B. $f(x) = \frac{5(x+4)(x-6)}{(x+1)(x-3)}$

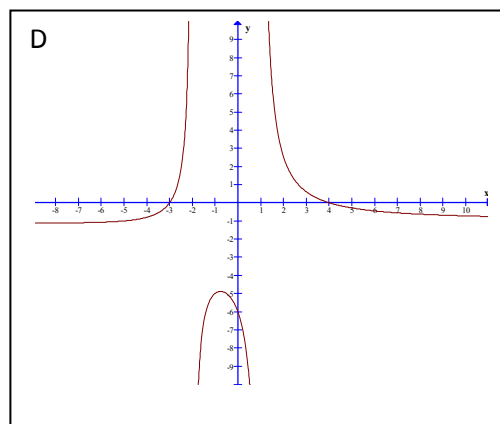
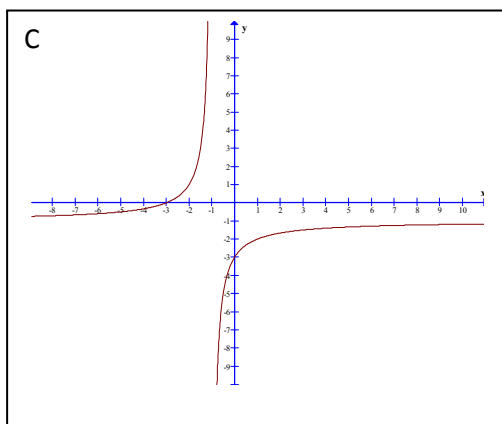
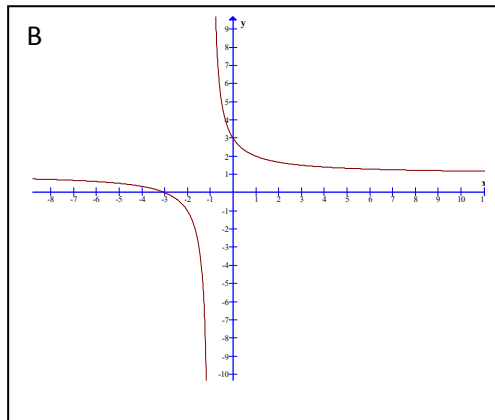
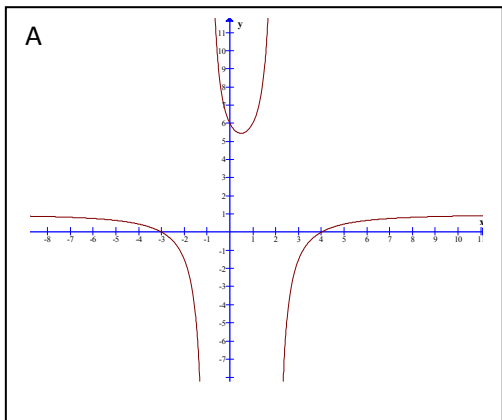
C. $f(x) = \frac{5(x-4)(x+6)}{(x+1)(x-3)}$

D. $f(x) = \frac{5(x-4)(x+6)}{(x-1)(x+3)}$

E. None of the above.

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14. Which of the following best represents $f(x) = \frac{x^2 + x - 6}{x^2 - x - 2}$?



15. Which vector has 3 times the magnitude and is in the same direction as vector $a = \langle 8, -4 \rangle$?

A. $\left\langle \frac{24}{\sqrt{80}}, \frac{-12}{\sqrt{80}} \right\rangle$

B. $\langle -24, 12 \rangle$

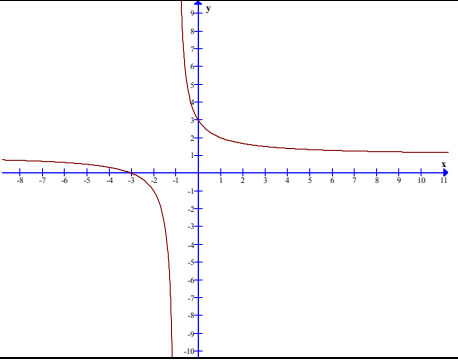
C. $\left\langle \frac{-24}{\sqrt{80}}, \frac{12}{\sqrt{80}} \right\rangle$

D. $\langle 24, -12 \rangle$

E. None of the above.

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Answers

	Answer	Letter
1.	52.4	D
2.	139.1°	D
3.	114 miles	A
4.	51.6 meters	C
5.	$35i - 8j$	E
6.	$\ a\ = 6.4, \theta = 231.3^\circ$	A
7.	14.5 lb	C
8.	<i>true course</i> = 115.1° <i>ground speed</i> = 235.5 mph	B
9.	$\frac{21}{\sqrt{73}}i - \frac{56}{\sqrt{73}}j$.	A
10.	$\left\langle \frac{9}{\sqrt{97}}, \frac{-4}{\sqrt{97}} \right\rangle$	D
11.	-105	B
12.	Only Statements III and IV are true.	C
13.	$f(x) = \frac{5(x+4)(x-6)}{(x-1)(x+3)}$	A
14.		B
15.	$\langle 24, -12 \rangle$	D