MA 154   Exam 3   Spring 2004

This exam covered from question #19 of section 7.6, 8.1, 8.2, 8.4, and all of section 4.5

1.   Find the magnitude of vector $\langle 8, -5 \rangle$.

A. $\sqrt{39}$

B. $\sqrt{13}$

C. $\sqrt{26}$

D. $\sqrt{3}$

E. None of the above.

2.   Write the expression as an algebraic expression in a for $a > 0$.

$$\cos\left[2\sin^{-1}\left(\frac{3}{a}\right) \right]$$

A. $\dfrac{6a}{a^2 + 9}$

B. $\dfrac{6\sqrt{a^2 - 9}}{a^2}$

C. $\dfrac{a^2 - 9}{a^2 + 9}$

D. $\dfrac{a^2 - 18}{a^2}$

E. None of the above.

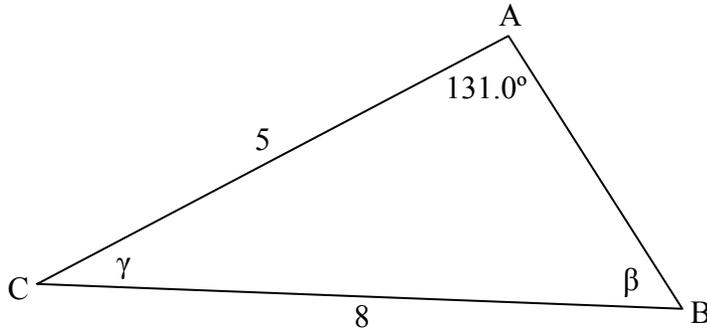3.   Approximate, to four decimal places, the solution(s) of the equation that are in the interval $[0, 2\pi)$.

$$\cos^2 \alpha - 3\cos\alpha + 1 = 0$$

A. 0.3820, 2.6180

B. 0.3820, 5.9012

C. 2.6180, 3.6652

D. 1.1789, 5.1043

E. None of the above.

This exam covered from question #19 of section 7.6, 8.1, 8.2, 8.4, and all of section 4.5

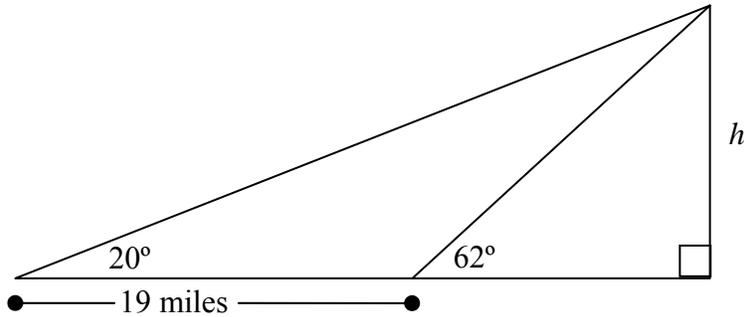4.　　　Given the following triangle, $\beta - \gamma$ is:

A.　Between 7.0° and 7.5°

B.　Between 7.5° and 8.0°

C.　Between 8.0° and 8.5°

D.　Between 8.5° and 9.0°

E.　None of the above.

5.　　　A surveyor notes that the direction from A to B is N12°W and the direction from A to C is N71°W. The distance from A to B is 200 meters, and the distance from B to C is 300 meters. To the nearest meter, approximate the distance from A to C.

A.　250 meters

B.　349 meters

C.　224 meters

D.　374 meters

E.　None of the above.

2

This exam covered from question #19 of section 7.6, 8.1, 8.2, 8.4, and all of section 4.5

6.   Given the following diagram, approximate the value of h to the nearest tenth of a mile.

A. 8.1 miles

B. 9.7 miles

C. 9.2 miles

D. 8.6 miles

E. None of the above.

(Diagram: triangle with angles 20° and 62°, base of 19 miles, height h, right angle.)

7.   An airplane flies 150 miles from point A in the direction 110° and then travels in the direction 40° for 200 miles. To the nearest mile, approximate the distance the plane is now from point A.

A. 228 miles

B. 205 miles

C. 288 miles

D. 250 miles

E. None of the above.

This exam covered from question #19 of section 7.6, 8.1, 8.2, 8.4, and all of section 4.5

8.   To the nearest tenth of a degree, find the smallest positive angle from the positive *x*-axis to the vector $-4i + 5j$.

           A. 128.7°

           B. 308.7°

           C. 51.3°

           D. 231.3°

           E. None of the above.

9.   Find the vector of magnitude 7 that is in the opposite direction of vector $-2i + 6j$.

           A. $14i - 42j$

           B. $-\dfrac{7}{\sqrt{10}}i + \dfrac{21}{\sqrt{10}}j$

           C. $-14i + 42j$

           D. $\dfrac{7}{\sqrt{10}}i - \dfrac{21}{\sqrt{10}}j$

           E. None of the above.

10.   Which of the following statement(s) is/are true about the graph of $f(x) = \dfrac{x+3}{x^2 + 3x + 2}$?

     I.   The *x*-intercept is at $(-3,0)$.

     II.   The *y*-intercept is at $(0,-3)$.

     III.   For $x < -3, f(x) > 0$.

           A. I and II only

           B. I and III only

           C. II and III only

           D. I, II and III

           E. None of the above.

This exam covered from question #19 of section 7.6, 8.1, 8.2, 8.4, and all of section 4.5

11. An airplane, with airspeed of 250 mile per hour, is flying in the direction of 62º and a 40 mile per hour wind is blowing directly from the west. Approximate the true course, (direction of the resultant), of the airplane to the nearest degree.

A. 70º

B. 68º

C. 66º

D. 72º

E. None of the above.

12. To the nearest tenth of a degree, find the angle between vectors $\langle 5,4 \rangle$ and $\langle -4,-7 \rangle$.

A. 158.4º

B. 81.1º

C. 21.6º

D. 98.9º

E. None of the above.

13. Find an equation of a rational function that satisfies the given conditions.

Vertical asymptotes: $x = 3, x = -1$

Horizontal asymptote: $y = 5$

x-intercepts: $(2,0),(4,0)$

A. $f(x) = \dfrac{5(x+2)(x+4)}{(x+3)(x-1)}$
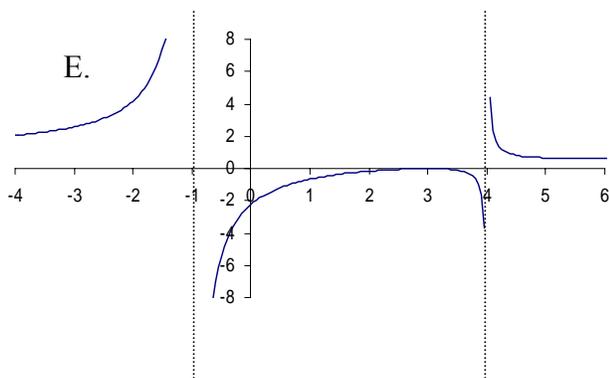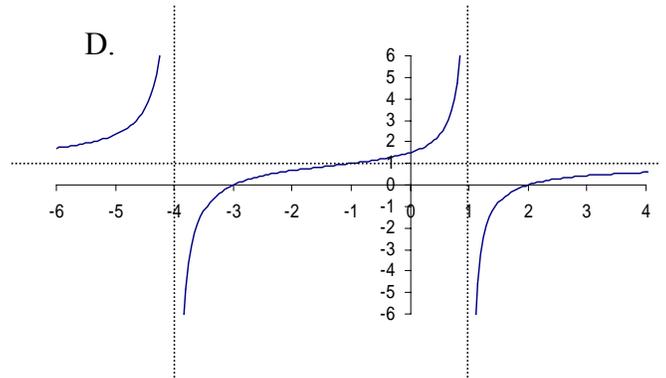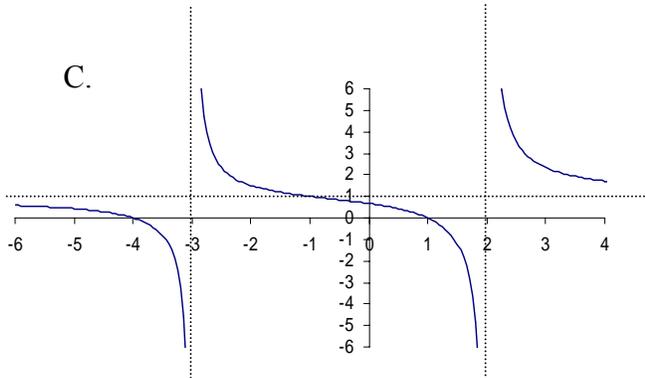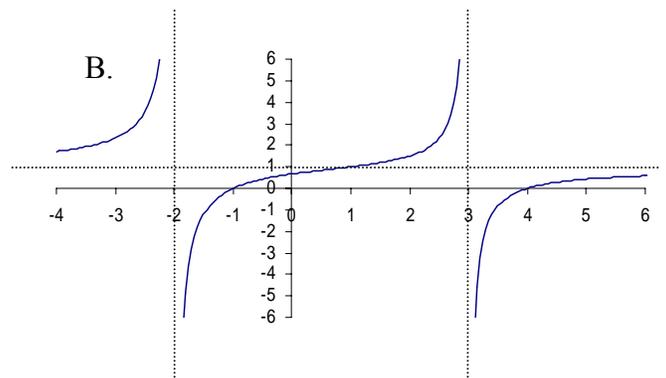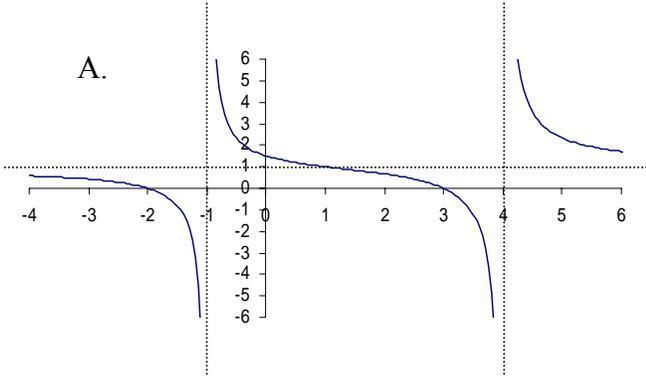
B. $f(x) = \dfrac{5(x-2)(x-4)}{(x-3)(x+1)}$

C. $f(x) = \dfrac{5(x-3)(x+1)}{(x-2)(x-4)}$

D. $f(x) = \dfrac{5(x+3)(x-1)}{(x+2)(x+4)}$

E. None of the above.

This exam covered from question #19 of section 7.6, 8.1, 8.2, 8.4, and all of section 4.5

14.   Which of the following best represents the graph of $f(x) = \dfrac{x^2 - x - 6}{x^2 - 3x - 4}$?

A.

B.

C.

D.

E.

This exam covered from question #19 of section 7.6, 8.1, 8.2, 8.4, and all of section 4.5

	Answers	Letter
1	$\sqrt{89}$	E
2	$\dfrac{a^2 - 18}{a^2}$	D
3	1.1789, 5.1043	D
4	7.29	A
5	349 meters	B
6	8.6 miles	D
7	288 miles	C
8	128.7º	A
9	$\dfrac{7}{\sqrt{10}}i - \dfrac{21}{\sqrt{10}}j$	D
10	I only	E
11	66º	C
12	158.4º	A
13	$f(x) = \dfrac{5(x-2)(x-4)}{(x-3)(x+1)}$	B
14	See exam	A