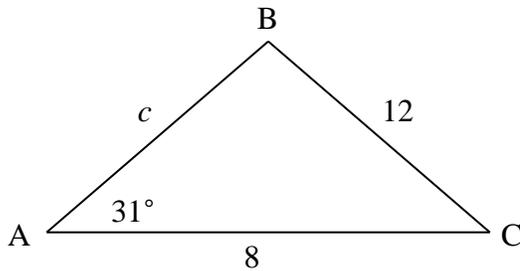# MA 154 Exam 3 Fall 2003

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and through question #14 of section 4.5.

1. Find $3a - 2b$ for $a = 2i - 3j$ and $b = -i + j$.

 A. $10i - 15j$

 B. $8i - 11j$

 C. $4i - 7j$

 D. $7i - 15j$

 E. None of these.

2. Find the exact value of the expression $\tan\left(2\cos^{-1}\dfrac{40}{41}\right)$.

 A. $\dfrac{759}{1600}$

 B. $\dfrac{797}{1681}$

 C. $\dfrac{720}{1519}$

 D. $\dfrac{237}{500}$

 E. None of these.

3. Write the trigonometric expression $\cos\left(2\sin^{-1} x\right)$ as an algebraic expression in x for $0 < x < 1$.

 A. $1 - 2x^2$

 B. $2x\sqrt{1 - x^2}$

 C. $2x^2 - 1$

 D. $\dfrac{2x}{\sqrt{1 - x^2}}$

 E. None of these.

1

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and through question #14 of section 4.5.

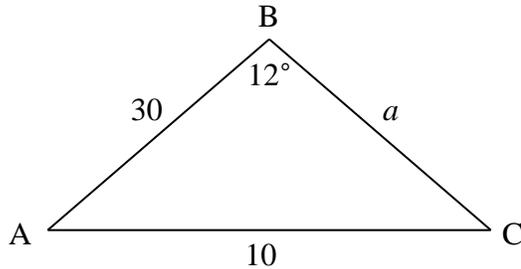4.   In the triangle given below, find   rounded to the nearest tenth of a degree.

A. 21.8°

B. 162.5°

C. 17.5°

D. 159.9°

E. None of these.

5.   To determine the distance between two points A and B, a surveyor chooses a point C that is 321 feet from A and 562 feet from B. If   BAC measures 52°, approximate the distance between A and B to the nearest foot.

A. 647 feet

B. 602 feet

C. 461 feet
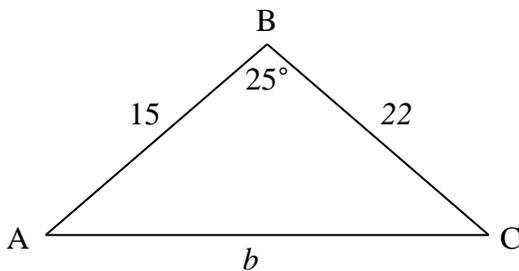
D. 699 feet

E. None of these.

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and through question #14 of section 4.5.

6. In the triangle given below, one possible length of side *a* is 37.2, find the other possible length of side *a* rounded to the nearest tenth.

A. 27.1

B. 28.3

C. 31.6

D. 21.5

E. None of these.

7. In the triangle given below, find *b* rounded to the nearest tenth.

A. 16.1

B. 17.7

C. 10.5

D. 26.6

E. None of these.

MA 154   Exam 3   Fall 2003

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and
through question #14 of section 4.5.

8.   Two cars leave a city at the same time and travel along straight highways that differ
in direction by an unknown angle. If they are 54 miles apart after the first car
travels 32 miles and the second car travels 50 miles, by what angle does the two
highways differ?

                 A. Between 76° and 78°

                 B. Between 102° and 104°

                 C. Between 86° and 88°

                 D. Between 100° and 102°

                 E. Between 78° and 80°

9.   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. 81 miles

                 C. 54 miles

                 D. 103 miles

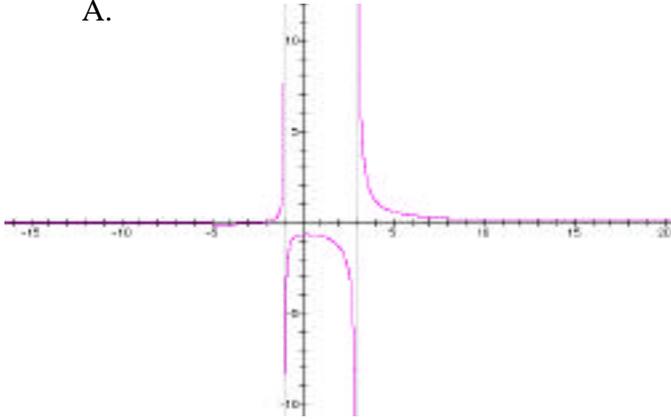   E. None of these.

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and through question #14 of section 4.5.

10. The vectors a = 8.0 lb and b = 10.0 lb represent two forces acting at the same point, and = 50° is the angle between the two forces. Approximate the magnitude of the resultant force to the nearest tenth of a pound.

         A. 16.3 lb

         B. 7.8 lb

         C. 12.8 lb

         D. 12.3 lb

         E. None of these.

11. An airplane with airspeed of 250 miles per hour is flying in the direction 120° and a 50-mile per hour wind is blowing directly from the west. Using that information, the ground speed (resultant speed) of the plane calculates to 294.4 miles per hour. Approximate the true course (direction of the resultant) of the airplane to the nearest degree.

         A. 135°

         B. 115°

         C. 125°
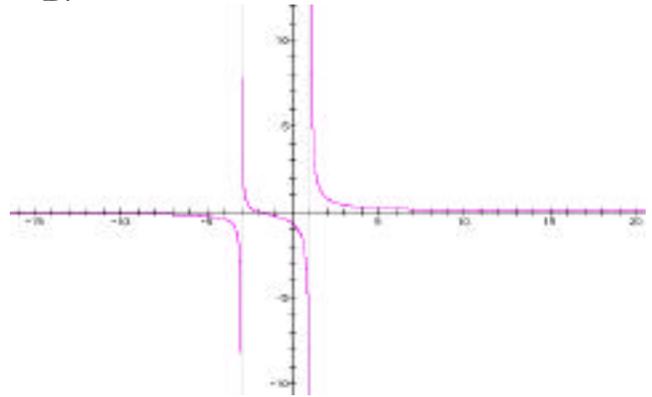
         D. 117°

         E. None of these.

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and through question #14 of section 4.5.

12.   Which of the following is the graph of $f(x) = \dfrac{x+2}{x^2 - 2x - 3}$?
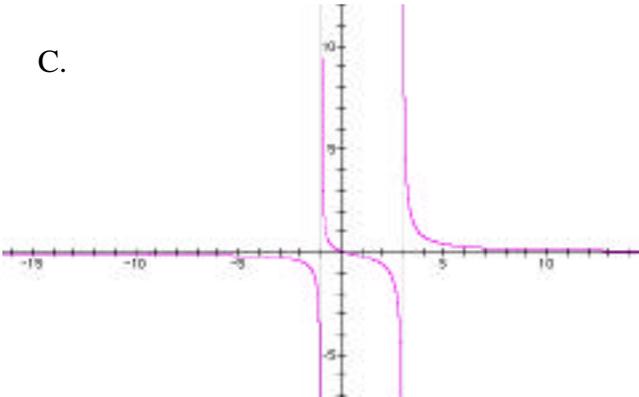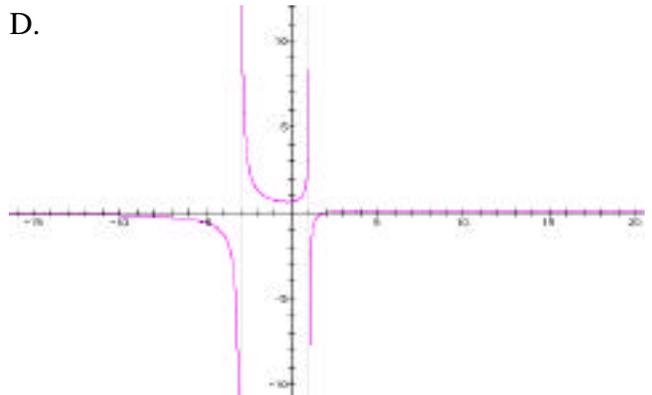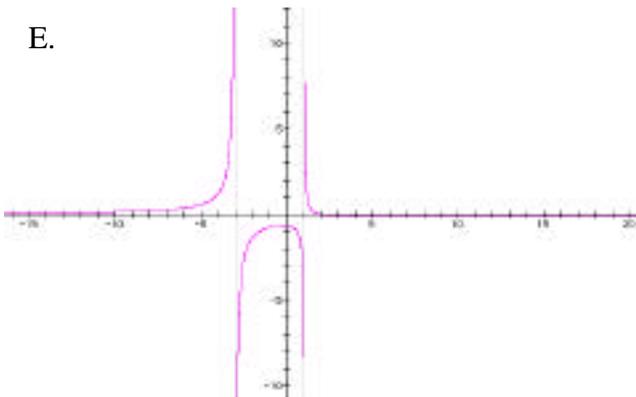
A.

B.

C.

D.

E.

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and through question #14 of section 4.5.

13. Given $a = \langle 1, -2 \rangle$, $b = \langle -3, 5 \rangle$ and $c = \langle m, 3 \rangle$, find m such that $(2a + b)$ and c are orthogonal.

    A. 1

    B. -2

    C. 3

    D. -4

    E. None of these.

14. Find the solutions of the equation $3\cos^2 \theta - 3\cos \theta - 1 = 0$ that are in the interval $[0, 2\pi)$, rounded to the nearest hundredth.
    (Warning…Warning…Check the mode of your calculator.)

    A. 1.26, 5.02

    B. 1.84, 4.45

    C. 1.88, 4.40

    D. 1.26, 0.26

    E. None of these.

This exam covers section 7.6, starting with question #19, sections 8.1, 8.2, 8.3. 8.4 and through question #14 of section 4.5.

Exam 3 Answers

Question		
1	$8i - 11j$	B
2	$\dfrac{720}{1519}$	C
3	$1 - 2x^2$	A
4	$= 20.1°$	E. None of these.
5	699 feet	D
6	21.5	D
7	10.5	C
8	79.0°	E. Between 78° and 80°
9	103 miles	D
10	16.3 lb	A
11	115°	B
12		A
13	3	C
14	1.84, 4.45	B