Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

1. Determine *m* such that the two vectors are orthogonal.

$a = 5mi + 4j,\ b = 2i - 5j$

A. $m = 4$

B. $m = 2$

C. $m = -4$

D. $m = -2$

E. None of the above

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

A. $-5i + 7j$

B. $24i + 10j$

C. $19i - 8j$

D. $-6i - 18j$

E. None of the above

Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

3. Given ΔABC with angle $\alpha = 30°$, side a = 4.8 and side b = 5.6, there exist two distinct ΔABC. Find the perimeter of both triangles to the nearest tenth.

A. 19.1 and 13.4

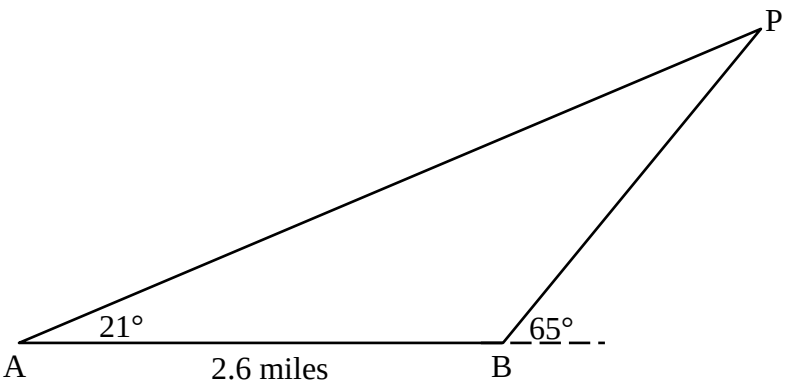
B. 19.1 and 15.6

C. 11.4 and 15.6

D. 19.1 and 11.4

E. None of the above

4. Given the length of AB is 2.6 miles, find the length of AP to the nearest tenth of a mile.



A. 4.3 miles

B. 4.1 miles

C. 3.4 miles

D. 3.2 miles

E. None of the above

Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

5. **Airplane course and ground speed.** An airplane with airspeed of 210 mi/hr is flying in the direction 56°, and a 41 mi/hr wind is blowing directly from the west. Approximate (to the nearest tenth of a degree) the true course.

A. 61.4°

B. 62.5°

C. 50.6°

D. 49.5°

E. None of the above

6. Given ΔABC with angle $\alpha = 31°$, side $b = 15.0$ and side $c = 12.0$, find angle β to the nearest tenth of degree.

A. 127.3°

B. 83.7°

C. 52.7°

D. 96.3°

E. None of the above

Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

7. Tim decides to go for a jog. We are not sure why, maybe so he could write this problem. Regardless, he jogs at a rate of 9 miles per hour in the direction S14°W for 20 minutes and then in the direction N34°W for 12 minutes. To the nearest tenth of a mile, how far is he from his start point? You might want to call 911, he does not look good.

A. 4.4 miles

B. 2.9 miles

C. 2.2 miles

D. 3.2 miles

E. None of the above

8. Given vector $c = -5i + 7j$, find $\|c\|$ and the smallest positive angle θ from the positive *x*-axis to *c*. Round both answers to the nearest tenth.

A. $\|c\| = 8.6, \theta = 125.5°$

B. $\|c\| = 4.9, \theta = 144.5°$

C. $\|c\| = 8.6, \theta = 144.5°$

D. $\|c\| = 4.9, \theta = 125.5°$

E. None of the above

Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

9. The vectors *a* and *b* represent two forces acting at the same point and θ is the smallest positive angle between *a* and *b*. Approximate the magnitude of the resultant force to the nearest tenth.

$a = 6.9$ lb, $b = 8.9$ lb, $\theta = 67°$

A. 12.3 lb

B. 10.1 lb

C. 8.9 lb

D. 13.2 lb

E. None of the above

10. Find a vector that has the same direction as vector $v = \langle -12, 5 \rangle$ and 6 times its magnitude.

A. $\left\langle \frac{-72}{13}, \frac{30}{13} \right\rangle$

B. $\langle -72, 30 \rangle$

C. $\left\langle \frac{72}{13}, \frac{-30}{13} \right\rangle$

D. $\langle 72, -30 \rangle$

E. None of the above

Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

11. Find the angle between the vectors $a = \langle -3, -6 \rangle$ and $b = \langle -5, 7 \rangle$ to the nearest tenth.

A. 117.9°

B. 120.6°

C. 168.5°

D. 171.0°

E. None of the above

12. If forces $\mathbf{F_1}$, $\mathbf{F_2}$, . . . $\mathbf{F_n}$ act at a point P, the net (or resultant) force **F** is the sum $\mathbf{F_1} + \mathbf{F_2} + \ldots + \mathbf{F_n}$. If **F** = 0, the forces are said to be in equilibrium.

Given: $F_1 = \langle -6, -7 \rangle, F_2 = \langle 5, -4 \rangle,$ and $F_3 = \langle 3, 5 \rangle,$ find an additional force **G** such that equilibrium occurs.

A. $G = \langle 2, -6 \rangle$

B. $G = \langle -4, 8 \rangle$

C. $G = \langle -2, 6 \rangle$

D. $G = \langle 4, -8 \rangle$

E. None of the above

Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

13. What are the horizontal and vertical asymptotes of $f(x)=\dfrac{3x+6}{x^2+2x-35}$?

A. Horizontal asymptote: $y=3$
Vertical asymptotes: $x=5, x=-7$

B. Horizontal asymptote: $y=0$
Vertical asymptotes: $x=5, x=-7$

C. Horizontal asymptote: $y=0$
Vertical asymptotes: $x=-5, x=7$

D. Horizontal asymptote: $y=3$
Vertical asymptotes: $x=-5, x=7$

E. None of the above

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

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

A. $0.37820, 2.7512$

B. $0.6404, -0.3904$

C. $3.7112, 2.7694$

D. $0.5696, -0.3722$

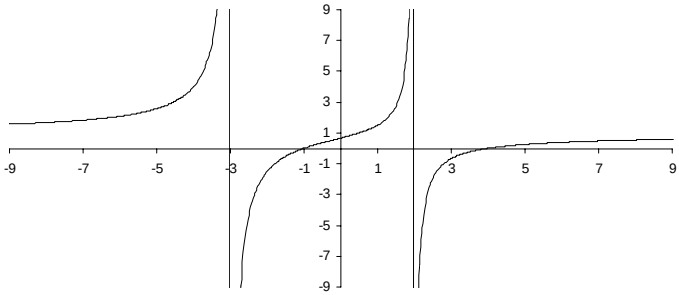
E. None of the above

Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

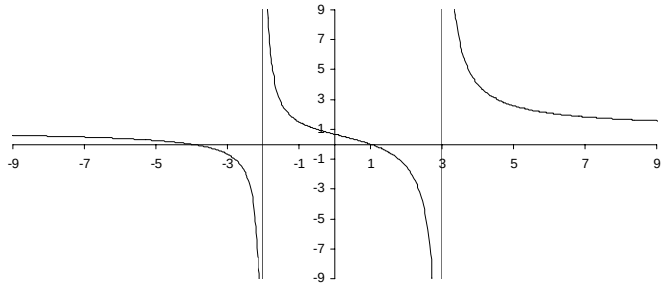
15. Which of the following is the best representation of $f(x)=\dfrac{x^2-3x-4}{x^2+x-6}$?

(Note: There are only four possible answers for this problem)

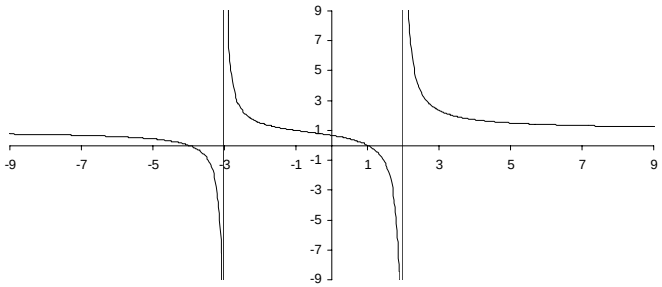
A.



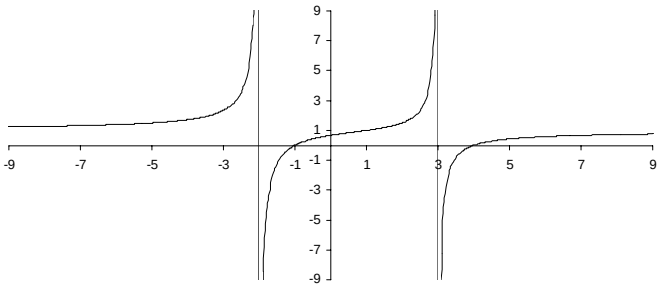
B.



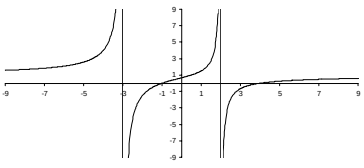
C.



D.



Covers Section 7.6 starting with question #53, all of sections 8.1, 8.2, 8.3. 8.4, and section 4.5 up to question #32

Question	Answer	Letter
1.	$m = 2$	B
2.	$19i - 20j$	E
3.	19.1 and 11.4	D
4.	3.4 miles	C
5.	61.4°	A
6.	96.3°	D
7.	2.2 miles	C
8.	$\|c\| = 8.6, \theta = 125.5°$	A
9.	13.2 lb	D
10.	$\langle -72, 30 \rangle$	B
11.	117.9°	A
12.	$G = \langle -2, 6 \rangle$	C
13.	Horizontal asymptote: $y = 0$ Vertical asymptotes: $x = 5, x = -7$	B
14.	$0.5696, -0.3722$	D
15.		A