

1. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_8.pg

Find a vector  $\mathbf{a}$  with representation given by the directed line segment  $\overrightarrow{AB}$ , where  $A(-2, -2)$  and  $B(1, 7)$ .

Answer: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\langle 3, 9 \rangle$

2. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_24.pg

Find the area of the parallelogram with vertices  $A(-1, 3, 3)$ ,  $B(0, 5, 8)$ ,  $C(1, 2, 1)$ , and  $D(2, 4, 6)$ .

Area: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

• 13.0384

3. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_24.pg

Find the area of the parallelogram with vertices  $A(-1, 4, 3)$ ,  $B(0, 6, 5)$ ,  $C(1, 3, 1)$ , and  $D(2, 5, 3)$ .

Area: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

• 8.06226

4. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_10.pg

Find  $\mathbf{a} \cdot \mathbf{b}$  if  $|\mathbf{a}| = 6$ ,  $|\mathbf{b}| = 4$ , and the angle between  $\mathbf{a}$  and  $\mathbf{b}$  is  $\pi/6$ .

Answer: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $6 \cdot 4 \cdot \cos(\pi/6)$

5. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_24.pg

Find a unit vector that has the same direction as the vector  $8\mathbf{i} - 2\mathbf{j}$ .

Answer:  $\mathbf{u} =$  \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\langle 0.970143, -0.242536 \rangle$

6. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_23.pg

Find the area of the parallelogram with vertices  $A(1, 2)$ ,  $B(5, 3)$ ,  $C(3, 8)$ , and  $D(7, 9)$ .

Area: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

• 22

7. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_23.pg

Find the area of the parallelogram with vertices  $A(3, 2)$ ,  $B(8, 3)$ ,  $C(5, 7)$ , and  $D(10, 8)$ .

Area: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

• 23

8. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_20.pg

Find the angle  $\theta$  between the vectors  $\mathbf{a} = 10\mathbf{i} - \mathbf{j} - 4\mathbf{k}$  and  $\mathbf{b} = 2\mathbf{i} + \mathbf{j} - 10\mathbf{k}$ .

Answer (in radians):  $\theta =$  \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

• 1.00948

9. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_6.pg

Find the cross product  $(\mathbf{i} + e^t\mathbf{j} + e^{-t}\mathbf{k}) \times (3\mathbf{i} + e^t\mathbf{j} - e^{-t}\mathbf{k})$ .

Answer: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\langle -2, 4e^{-t}, -2e^t \rangle$

10. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_26.pg

Find a vector  $\mathbf{a}$  that has the same direction as  $\langle -10, 3, 10 \rangle$  but has length 5.

Answer:  $\mathbf{a} =$  \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\langle -3.45857, 1.03757, 3.45857 \rangle$

11. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_22.pg

Find the measures of the three angles, in radians, of the triangle with the given vertices:  $D(1, 1, 1)$ ,  $E(1, -3, 2)$ , and  $F(-6, 2, 4)$ .

1.  $\angle D =$  \_\_\_\_\_
2.  $\angle E =$  \_\_\_\_\_
3.  $\angle F =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- 1.60238
- 1.05375
- 0.485461

12. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_22.pg

Find the following expressions if  $\mathbf{a} = 3\mathbf{i} - 5\mathbf{k}$  and  $\mathbf{b} = \mathbf{i} + \mathbf{j} - 2\mathbf{k}$ .

1.  $|\mathbf{a}| =$  \_\_\_\_\_
2.  $\mathbf{a} + \mathbf{b} =$  \_\_\_\_\_
3.  $\mathbf{a} - \mathbf{b} =$  \_\_\_\_\_
4.  $3\mathbf{a} + 4\mathbf{b} =$  \_\_\_\_\_

Answer(s) submitted:

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- 
- 
- 

(incorrect)

Correct Answers:

- 5.83095
- $\langle 4, 1, -7 \rangle$
- $\langle 2, -1, -3 \rangle$
- $\langle 13, 4, -23 \rangle$

13. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_prob01.pg

Find volume of the parallelepiped determined by the vectors  $\mathbf{a} = \langle 8, 1, 0 \rangle$ ,  $\mathbf{b} = \langle 1, 6, 1 \rangle$ , and  $\mathbf{c} = \langle 1, 1, 10 \rangle$ .

Volume: \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- |463|

14. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_26.pg

For what values of  $b$  are the vectors  $\langle -67, b, 3 \rangle$  and  $\langle b, b^2, b \rangle$  orthogonal?

Answer (separate with commas)  $b =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- 0, -8, 8

15. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_38.pg

Find the scalar and vector projections of  $\mathbf{b}$  onto  $\mathbf{a}$ , where  $\mathbf{a} = \langle -1, 1, 2 \rangle$  and  $\mathbf{b} = \langle -2, 10, 6 \rangle$ .

1.  $\text{comp}_{\mathbf{a}} \mathbf{b} =$  \_\_\_\_\_
2.  $\text{proj}_{\mathbf{a}} \mathbf{b} =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- 9.79796
- $\langle -4, 4, 8 \rangle$

16. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_26.pg

Suppose we have the triangle with vertices  $P(1, 6, 1)$ ,  $Q(-3, 10, -3)$ , and  $R(5, -2, 1)$ . Answer the following questions.

1. Find a non-zero vector orthogonal to the plane through the points  $P$ ,  $Q$ , and  $R$ .

Answer: \_\_\_\_\_

2. Find the area of the triangle  $\triangle PQR$ .

Area: \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $\langle -32, -16, 16 \rangle$
- $1/2 * 39.1918$

17. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_8.pg

Find the following expressions if  $\mathbf{a} = 3\mathbf{i} - 5\mathbf{k}$ ,  $\mathbf{b} = \mathbf{i} + \mathbf{j} - 4\mathbf{k}$ , and  $\mathbf{c} = 4\mathbf{i} + \mathbf{j} + 3\mathbf{k}$ .

1.  $\mathbf{a} \cdot \mathbf{b} =$  \_\_\_\_\_
2.  $\mathbf{a} \cdot \mathbf{c} =$  \_\_\_\_\_
3.  $\mathbf{b} \cdot \mathbf{c} =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 
- 

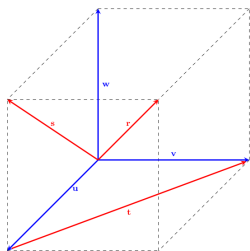
(incorrect)

Correct Answers:

- 23
- -3
- -7

18. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_prob02/s\_12\_2\_prob02.pg

Below is a diagram of the dotted cube with edges of length 2. Suppose vectors  $\mathbf{u} = \langle 2, 0, 0 \rangle$ ,  $\mathbf{v} = \langle 0, 2, 0 \rangle$ , and  $\mathbf{w} = \langle 0, 0, 2 \rangle$ . Find the following vectors.



1.  $\mathbf{u} + \mathbf{v} + 2\mathbf{w} =$  \_\_\_\_\_
2.  $\mathbf{t} =$  \_\_\_\_\_
3.  $\mathbf{t} - 2\mathbf{r} =$  \_\_\_\_\_
4.  $\mathbf{u} + \mathbf{v} + \mathbf{w} + \mathbf{r} + \mathbf{s} + \mathbf{t} =$  \_\_\_\_\_

**Note:** You can click on the graph to enlarge the image.

Answer(s) submitted:

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(incorrect)

Correct Answers:

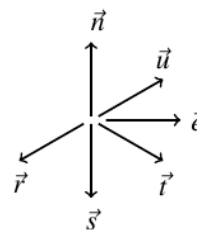
- $\langle 2, 2, 4 \rangle$
- $\langle -2, 2, 0 \rangle$
- $\langle -6, -2, -4 \rangle$
- $\langle 4, 6, 6 \rangle$

19. (1 point) Library/FortLewis/Calc3/13-3-Dot-product/geometric-dot-product/geometric-dot-product.pg

Several unit vectors  $\vec{r}, \vec{s}, \vec{t}, \vec{u}, \vec{n}$ , and  $\vec{e}$  in the xy-plane (not three-dimensional space) are shown in the figure.

Using the geometric definition of the dot product, are the following dot products positive, negative, or zero? You may assume that angles that look the same are the same.

- ? 1.  $\vec{e} \cdot \vec{r}$
- ? 2.  $\vec{n} \cdot \vec{t}$
- ? 3.  $\vec{e} \cdot \vec{s}$
- ? 4.  $\vec{r} \cdot \vec{u}$
- ? 5.  $\vec{t} \cdot \vec{u}$
- ? 6.  $\vec{r} \cdot \vec{s}$
- ? 7.  $\vec{s} \cdot \vec{t}$
- ? 8.  $\vec{n} \cdot \vec{e}$



(Click on graph to enlarge)

Answer(s) submitted:

- 
- 
- 
- 
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- 
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(incorrect)

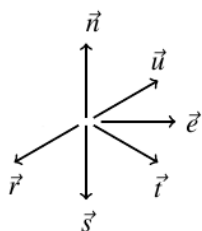
Correct Answers:

- Negative
- Negative
- Zero
- Negative
- Positive
- Positive
- Positive
- Zero

20. (1 point) Library/FortLewis/Calc3/13-3-Dot-product/geometric-dot-product/geometric-dot-product.pg

Using the geometric definition of the dot product, are the following dot products positive, negative, or zero? You may assume that angles that look the same are the same.

1.  $\vec{r} \cdot \vec{u}$
  2.  $\vec{t} \cdot \vec{u}$
  3.  $\vec{e} \cdot \vec{s}$
  4.  $\vec{s} \cdot \vec{t}$
  5.  $\vec{e} \cdot \vec{r}$
  6.  $\vec{r} \cdot \vec{s}$
  7.  $\vec{n} \cdot \vec{t}$
  8.  $\vec{n} \cdot \vec{e}$



(Click on graph to enlarge)

Answer(s) submitted:

- •  
•  
•  
•  
•  
•  
•

(incorrect)

*Correct Answers:*

- Negative
- Positive
- Zero
- Positive
- Negative
- Positive
- Negative
- Zero

**21. (1 point)** Library/WHFreeman/Holt\_linear\_algebra/Chaps\_1-4  
.1.50.pg

An industrial chemical company has three facilities A, B, and C. Each facility produces polyethylene ( PE), polyvinyl chloride ( PVC), and polystyrene ( PS). The table below gives the daily

	$A$	$B$	$C$
$PE$	60	40	40
$PVC$	30	30	100
$PS$	80	10	80

$a = \begin{bmatrix} \text{---} \\ \text{---} \\ \text{---} \end{bmatrix}$  Production at B is given by  $b = \begin{bmatrix} \text{---} \\ \text{---} \\ \text{---} \end{bmatrix}$  Produc-

tion at C is given by  $c = \begin{bmatrix} \text{---} \\ \text{---} \\ \text{---} \end{bmatrix}$ .

(b) Compute  $15c = \begin{bmatrix} \text{---} \\ \text{---} \\ \text{---} \end{bmatrix}$ . The entries tell us that in facility C, the company produces      tons of PE,      tons of PVC, and      tons of PS over a period of      days.

(c) Determine the combined output from all three facilities over a 2-week period. (Note: The facility does not operate on weekends.) Over that period we produce \_\_\_\_ tons of PE, \_\_\_\_ tons of PVC, and \_\_\_\_ tons of PS in the three facilities.

(d) Determine the number of days of production from from each facility required to produce 1180 tons of PE, 1410 tons of PVC, and 1380 tons of PS.

For that production we need \_\_\_\_ days at facility A, \_\_\_\_ days at facility B, and \_\_\_\_ days at facility C.

Answer(s) submitted:

- • • • •

(incorrect)

*Correct Answers:*

- 60
- 30
- 80

5

$$\mathbf{u} = \begin{bmatrix} 4 \\ -1 \\ -1 \end{bmatrix}, \mathbf{v} = \begin{bmatrix} 0 \\ 7 \\ -5 \end{bmatrix}, \mathbf{w} = \begin{bmatrix} 3 \\ -9 \\ 4 \end{bmatrix}$$

$$\text{Compute } 1\mathbf{u} - 3\mathbf{v} + 6\mathbf{w} = \begin{bmatrix} \text{---} \\ \text{---} \\ \text{---} \end{bmatrix}$$

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- 22
- -76
- 38

**26. (1 point)** Library/Michigan/Chap13Sec1/Q21.pg

For each of the following, perform the indicated operations on the vectors

$$\vec{a} = 4\vec{j} + 4\vec{k}, \vec{b} = -3\vec{i} - 3\vec{j} + \vec{k}, \vec{z} = 4\vec{i} + 3\vec{j}.$$

(a)  $4\vec{a} + 3\vec{b} = \text{---}$

(b)  $3\vec{a} + 4\vec{b} - 2\vec{z} = \text{---}$

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $-9\mathbf{i} + 7\mathbf{j} + 19\mathbf{k}$
- $-20\mathbf{i} - 6\mathbf{j} + 16\mathbf{k}$

**27. (1 point)** Library/Michigan/Chap13Sec1/Q39.pg

Find all vectors  $\vec{v}$  in 2 dimensions having  $||\vec{v}|| = 17$  where the  $\vec{j}$ -component of  $\vec{v}$  is  $8\vec{j}$ .

vectors:  $\text{---}$

(If you find more than one vector, enter them in a comma-separated list.)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $15\mathbf{i} + 8\mathbf{j}, -15\mathbf{i} + 8\mathbf{j}$

**28. (1 point)** Library/Michigan/Chap13Sec1/Q39.pg

Find all vectors  $\vec{v}$  in 2 dimensions having  $||\vec{v}|| = 13$  where the  $\vec{j}$ -component of  $\vec{v}$  is  $8\vec{j}$ .

vectors:  $\text{---}$

(If you find more than one vector, enter them in a comma-separated list.)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $12\mathbf{i} + 5\mathbf{j}, -12\mathbf{i} + 5\mathbf{j}$

**29. (1 point)** Library/Michigan/Chap13Sec1/Q41.pg

A truck is traveling due north at 40 km/hr approaching a crossroad. On a perpendicular road a police car is traveling west toward the intersection at 50 km/hr. Both vehicles will reach the crossroad in exactly one hour. Find the vector currently representing the displacement of the truck with respect to the police car.

displacement  $\vec{d} = \text{---}$

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $-50\mathbf{i} - 40\mathbf{j}$

**30. (1 point)** Library/Michigan/Chap13Sec1/Q29.pg

Find the value(s) of  $a$  making  $\vec{v} = 4a\vec{i} - 3\vec{j}$  parallel to  $\vec{w} = a^2\vec{i} + 6\vec{j}$ .

$a = \text{---}$

(If there is more than one value of  $a$ , enter the values as a comma-separated list.)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $0, -8$

**31. (1 point)** Library/Michigan/Chap13Sec1/Q29.pg

Find the value(s) of  $a$  making  $\vec{v} = 7a\vec{i} - 2\vec{j}$  parallel to  $\vec{w} = a^2\vec{i} + 4\vec{j}$ .

$a = \text{---}$

(If there is more than one value of  $a$ , enter the values as a comma-separated list.)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $0, -14$

**32. (1 point)** Library/Michigan/Chap13Sec1/Q33.pg

Resolve the following vectors into components:

(a) The vector  $\vec{v}$  in 2-space of length 3 pointing up at an angle of  $\pi/4$  measured from the positive  $x$ -axis.

$\vec{v} = \text{---} \vec{i} + \text{---} \vec{j}$

(b) The vector  $\vec{w}$  in 3-space of length 1 lying in the  $xz$ -plane pointing upward at an angle of  $2\pi/3$  measured from the positive  $x$ -axis.

$\vec{v} = \text{---} \vec{i} + \text{---} \vec{j} + \text{---} \vec{k}$

Answer(s) submitted:

- 
-

- 
- 
- 

(incorrect)

Correct Answers:

- $3 \cdot 0.707107$
- $3 \cdot 0.707107$
- $1 \cdot -0.5$
- 0
- $1 \cdot 0.866025$

**33. (1 point)** Library/Michigan/Chap13Sec1/Q17.pg

Find the length of the vectors

(a)  $-4\vec{i} + 4\vec{j} - 5\vec{k}$ : length = \_\_\_\_\_

(b)  $0.6\vec{i} - 0.8\vec{j} + 3\vec{k}$ : length = \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- 7.54983
- 3.16228

**34. (1 point)** Library/Michigan/Chap13Sec2/Q25.pg

A man wishes to row the shortest possible distance from north to south across a river which is flowing at 5 km/hr from the east. He can row at 7 km/hr.

(a) In which direction should he steer?

At an angle (in degrees) of \_\_\_\_\_ [?/west/east] of south.

(b) Suppose that when the man is in the middle of the river, a wind of 10 km/hr from the southwest starts.

In which direction should he steer to move straight across the river?

At an angle (in degrees) of \_\_\_\_\_ [?/west/east] of south.

Which bank of the river will the rower reach first?

- ?
- The north
- The south
- Neither

bank.

Answer(s) submitted:

- 
- 
- 
- 
- 

(incorrect)

Correct Answers:

- $180 \cdot \arcsin(5/7) / \pi$
- east

- $180 \cdot \arcsin((10/[\sqrt{2}]-5)/7) / \pi$
- west
- The north

**35. (1 point)** Library/Michigan/Chap13Sec2/Q13.pg

A plane is heading due west and climbing at the rate of 50 km/hr. If its airspeed is 500 km/hr and there is a wind blowing 110 km/hr to the northwest, what is the ground speed of the plane?

ground speed = \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- 580.51

**36. (1 point)** Library/Michigan/Chap13Sec2/Q09.pg

Which is traveling faster, a car whose velocity vector is  $21\vec{i} + 26\vec{j}$ , or a car whose velocity vector is  $30\vec{i}$ , assuming that the units are the same for both directions?

- ?
- the first car
- the second car

is the faster car.

At what speed is the faster car traveling?

speed = \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- the first car
- 33.4215

**37. (1 point)** Library/Michigan/Chap13Sec2/Q09.pg

Which is traveling faster, a car whose velocity vector is  $27\vec{i} + 32\vec{j}$ , or a car whose velocity vector is  $40\vec{i}$ , assuming that the units are the same for both directions?

- ?
- the first car
- the second car

is the faster car.

At what speed is the faster car traveling?

speed = \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- the first car

**38. (1 point)** Library/Michigan/Chap13Sec4/Q42.pg

In the following, find the vector representing the area of a surface. The magnitude of the vector equals the magnitude of the area; the direction is perpendicular to the surface. Since there are two perpendicular directions, we pick one by giving an orientation for the surface.

(a) The area vector  $\vec{A}_1$  for the rectangle with vertices  $(0, 0, 0)$ ,  $(3, 0, 0)$ ,  $(3, 1, 0)$ , and  $(0, 1, 0)$ , oriented so that it faces downward.

$\vec{A}_1 =$  \_\_\_\_\_

(b) The area vector  $\vec{A}_2$  for a circle of radius 3 in the  $yz$ -plane, facing in the direction of the positive  $x$ -axis.

$\vec{A}_2 =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $-3\mathbf{k}$
- 28.2743i

**39. (1 point)** Library/Michigan/Chap13Sec4/Q42.pg

In the following, find the vector representing the area of a surface. The magnitude of the vector equals the magnitude of the area; the direction is perpendicular to the surface. Since there are two perpendicular directions, we pick one by giving an orientation for the surface.

(a) The area vector  $\vec{A}_1$  for the rectangle with vertices  $(0, 0, 0)$ ,  $(-3, 0, 0)$ ,  $(-3, -3, 0)$ , and  $(0, -3, 0)$ , oriented so that it faces downward.

$\vec{A}_1 =$  \_\_\_\_\_

(b) The area vector  $\vec{A}_2$  for a circle of radius 4 in the  $yz$ -plane, facing in the direction of the positive  $x$ -axis.

$\vec{A}_2 =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $-9\mathbf{k}$
- 50.2655i

**40. (1 point)** Library/Michigan/Chap13Sec4/Q29.pg

If  $\vec{v} \times \vec{w} = 4\vec{i} - 2\vec{j} + 3\vec{k}$ , and  $\vec{v} \cdot \vec{w} = 2$ , and  $\theta$  is the angle between  $\vec{v}$  and  $\vec{w}$ , then

(a)  $\tan \theta =$  \_\_\_\_\_

(b)  $\theta =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- 5.38516/2
- $\text{atan}(5.38516/2)$

**41. (1 point)** Library/Michigan/Chap13Sec4/Q29.pg

If  $\vec{v} \times \vec{w} = \vec{i} + \vec{j} - 4\vec{k}$ , and  $\vec{v} \cdot \vec{w} = 4$ , and  $\theta$  is the angle between  $\vec{v}$  and  $\vec{w}$ , then

(a)  $\tan \theta =$  \_\_\_\_\_

(b)  $\theta =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- 4.24264/4
- $\text{atan}(4.24264/4)$

**42. (1 point)** Library/Michigan/Chap13Sec4/Q28.pg

Suppose  $\vec{v} \cdot \vec{w} = 6$  and  $\|\vec{v} \times \vec{w}\| = 4$ , and the angle between  $\vec{v}$  and  $\vec{w}$  is  $\theta$ . Find

(a)  $\tan \theta =$  \_\_\_\_\_

(b)  $\theta =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- 4/6
- $\text{atan}(4/6)$

**43. (1 point)** Library/Michigan/Chap13Sec4/Q28.pg

Suppose  $\vec{v} \cdot \vec{w} = 4$  and  $\|\vec{v} \times \vec{w}\| = 3$ , and the angle between  $\vec{v}$  and  $\vec{w}$  is  $\theta$ . Find

(a)  $\tan \theta =$  \_\_\_\_\_

(b)  $\theta =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- 3/4
- $\text{atan}(3/4)$

**44. (1 point)** Library/Michigan/Chap13Sec3/Q53.pg

Find a vector  $\vec{w}$  that bisects the smaller of the two angles formed by  $12\vec{i} + 5\vec{j}$  and  $15\vec{i} - 8\vec{j}$ .

$\vec{w} =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:



- 1.80543i-0.0859729j

45. (1 point) Library/Michigan/Chap13Sec3/Q53.pg

Find a vector  $\vec{w}$  that bisects the smaller of the two angles formed by  $8\vec{i} + 15\vec{j}$  and  $9\vec{i} - 40\vec{j}$ .

$\vec{w} =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- 0.6901i-0.0932568j

46. (1 point) Library/Michigan/Chap13Sec3/Q46.pg

A basketball gymnasium is 30 meters high, 85 meters wide and 240 meters long. For a half time stunt, the cheerleaders want to run two strings, one from each of the two corners above one basket to the diagonally opposite corners of the gym floor. What is the cosine of the angle made by the strings as they cross?

$\cos(\theta) =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $(-85^2 + 240^2 + 30^2) / (85^2 + 240^2 + 30^2)$

47. (1 point) Library/Michigan/Chap13Sec3/Q25.pg

The force on an object is  $\vec{F} = -22\vec{j}$ . For the vector  $\vec{v} = -4\vec{i} + 5\vec{j}$ , find:

(a) The component of  $\vec{F}$  parallel to  $\vec{v}$ : \_\_\_\_\_

(b) The component of  $\vec{F}$  perpendicular to  $\vec{v}$ : \_\_\_\_\_

The work,  $W$ , done by force  $\vec{F}$  through displacement  $\vec{v}$ :

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- 10.7317i-13.4146j
- -10.7317i-8.58537j
- -110

48. (1 point) Library/Michigan/Chap13Sec3/Q48.pg

An airplane is flying toward the southwest. Consider the wind velocity vectors

$$\vec{w}_1 = 4\vec{i} - \vec{j} \quad \vec{w}_2 = -\vec{i} - 3\vec{j} \quad \vec{w}_3 = \vec{i} + 5\vec{j}$$

$$\vec{w}_4 = -8\vec{i} + 2\vec{j} \quad \vec{w}_5 = -4\vec{i} - \vec{j}.$$

Which of the wind velocity vectors increases the plane's speed the most?

Wind [?/w1/w2/w3/w4/w5]

Which slows down the plane the most?

Wind [?/w1/w2/w3/w4/w5]

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- w4
- w3

49. (1 point) Library/Michigan/Chap13Sec3/Q48.pg

An airplane is flying toward the southeast. Consider the wind velocity vectors

$$\vec{w}_1 = -5\vec{i} - \vec{j} \quad \vec{w}_2 = \vec{i} - 3\vec{j} \quad \vec{w}_3 = -\vec{i} + 9\vec{j}$$

$$\vec{w}_4 = 11\vec{i} + 2\vec{j} \quad \vec{w}_5 = 6\vec{i} - \vec{j}.$$

Which of the wind velocity vectors increases the plane's speed the most?

Wind [?/w1/w2/w3/w4/w5]

Which slows down the plane the most?

Wind [?/w1/w2/w3/w4/w5]

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- w4
- w3

50. (1 point) Library/Michigan/Chap13Sec3/Q29.pg

Consider the vectors

$$\vec{a} = 2\vec{i} + \vec{j} - \vec{k}, \quad \vec{b} = \vec{i} + 2\vec{j} + 3\vec{k}, \quad \vec{c} = \vec{i} - 2\vec{j}$$

$$\vec{d} = 2\vec{i} - \vec{j} + \vec{k}, \quad \vec{g} = \vec{i} + 0.5\vec{j} + 0.5\vec{k}.$$

Which pairs (if any) of these vectors are

(a) Are perpendicular?

(Enter **none** or a pair or list of pairs, e.g., if  $\vec{a}$  is perpendicular to  $\vec{b}$  and  $\vec{c}$ , enter (a,b),(a,c).)

(b) Are parallel?

(Enter **none** or a pair or list of pairs, e.g., if  $\vec{a}$  is parallel to  $\vec{b}$  and  $\vec{c}$ , enter (a,b),(a,c).)

(c) Have an angles less than  $\pi/2$  between them?

(Enter **none** or a pair or list of pairs, e.g., if  $\vec{a}$  is at an angle less than  $\pi/2$  from  $\vec{b}$  and  $\vec{c}$ , enter (a,b),(a,c).)

(d) Have an angle of more than  $\pi/2$  between them?

(Enter **none** or a pair or list of pairs, e.g., if  $\vec{a}$  is at an angle greater than  $\pi/2$  from  $\vec{b}$  and  $\vec{c}$ , enter (a,b),(a,c).)

Answer(s) submitted:

-

- 
- 
- 

(incorrect)

Correct Answers:

- (a, c), (c, g)
- none
- (a, b), (a, d), (a, g), (b, d), (b, g), (c, d), (d, g)
- (b, c)

**51. (1 point)** Library/Michigan/Chap13Sec3/Q05.pg

Let  $\vec{a}$ ,  $\vec{b}$ ,  $\vec{c}$  and  $\vec{y}$  be the three dimensional vectors

$$\vec{a} = 4\vec{j} + 3\vec{k}, \quad \vec{b} = -3\vec{i} + 7\vec{j} + \vec{k}, \quad \vec{c} = 2\vec{i} - 6\vec{j}, \quad \vec{y} = -\vec{i} + \vec{j}$$

Perform the following operations on these vectors:

(a)  $\vec{c} \cdot \vec{a} + \vec{a} \cdot \vec{y} =$  \_\_\_\_\_

(b)  $(\vec{a} \cdot \vec{b})\vec{a} =$  \_\_\_\_\_

(c)  $((\vec{c} \cdot \vec{c})\vec{a}) \cdot \vec{a} =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- -20
- $124\vec{j} + 93\vec{k}$
- 1000

**52. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec

tors-29b.pg

Find a fully reduced equation for the set of all points in  $\mathbb{R}^2$  (i.e., the  $xy$ -plane) that are equidistant from the points  $A = (-5, 3)$  and  $B = (2, -4)$ . Recall that a point  $P = (x, y)$  is equidistant from  $A$  and  $B$  if  $d(P, A) = d(P, B)$ .

\_\_\_\_\_ help (equations)

On paper, plot a graph of this set of points. In the box below, describe this set of points geometrically. Explain your answer using complete sentences with correct grammar, spelling and punctuation.

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $14x - 14y = -14$
- Undefined

**53. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec

tors-29b.pg

Find a fully reduced equation for the set of all points in  $\mathbb{R}^2$  (i.e., the  $xy$ -plane) that are equidistant from the points  $A = (1, 3)$  and  $B = (5, 0)$ . Recall that a point  $P = (x, y)$  is equidistant from  $A$  and  $B$  if  $d(P, A) = d(P, B)$ .

\_\_\_\_\_ help (equations)

On paper, plot a graph of this set of points. In the box below, describe this set of points geometrically. Explain your answer using complete sentences with correct grammar, spelling and punctuation.

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $8x - 6y = 15$
- Undefined

**54. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec

tors-30b.pg

Find a fully reduced equation for the set of all points in  $\mathbb{R}^3$  (i.e.,  $xyz$ -space) that are equidistant from the points  $A = (4, -3, 0)$  and  $B = (0, 5, 5)$ . Recall that a point  $P = (x, y, z)$  is equidistant from  $A$  and  $B$  if  $d(P, A) = d(P, B)$ .

\_\_\_\_\_ help (equations)

On paper, plot a graph of this set of points. In the box below, describe this set of points geometrically. Explain your answer using complete sentences with correct grammar, spelling and punctuation.

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $16y - 8x + 10z = 25$

- Undefined

**55. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-31a.pg

(a) What is the distance from an arbitrary point  $(x, y)$  in  $\mathbb{R}^2$  to the  $x$ -axis?

(b) Find a fully simplified equation for the set of all points  $P = (x, y)$  equidistant from the  $x$ -axis and the point  $(2, -1)$ . Plot a graph of this set of points and describe this set geometrically.  
y = \_\_\_\_\_ help (formulas)

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- y
- $[(x-2)^2+1]/(-2)$

**56. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-31a.pg

(a) What is the distance from an arbitrary point  $(x, y)$  in  $\mathbb{R}^2$  to the  $x$ -axis?

(b) Find a fully simplified equation for the set of all points  $P = (x, y)$  equidistant from the  $x$ -axis and the point  $(-1, 2)$ . Plot a graph of this set of points and describe this set geometrically.  
y = \_\_\_\_\_ help (formulas)

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- y
- $([x-(-1)]^2+4)/4$

**57. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-29a.pg

Find a fully reduced equation for the set of all points in  $\mathbb{R}^2$  (i.e., the  $xy$ -plane) that are equidistant from the points  $A = (3, -1)$  and  $B = (0, 0)$ . Recall that a point  $P = (x, y)$  is equidistant from  $A$  and  $B$  if  $d(P, A) = d(P, B)$ . Plot a graph of this set of points and describe this set geometrically.

\_\_\_\_\_ help (equations)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $2*y-6*x = -10$

**58. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-29a.pg

Find a fully reduced equation for the set of all points in  $\mathbb{R}^2$  (i.e., the  $xy$ -plane) that are equidistant from the points  $A = (1, -5)$  and  $B = (-1, -2)$ . Recall that a point  $P = (x, y)$  is equidistant from  $A$  and  $B$  if  $d(P, A) = d(P, B)$ . Plot a graph of this set of points and describe this set geometrically.

\_\_\_\_\_ help (equations)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $6*y-4*x = -21$

**59. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-14.pg

Find the lengths of the three sides of the triangle  $ABC$  in  $\mathbb{R}^3$  if  $A = (-3, 2, 1)$ ,  $B = (3, -3, 4)$  and  $C = (0, 0, 2)$ . Enter your answers as a comma separated list.

\_\_\_\_\_ help (numbers)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- 8.3666, 3.74166, 4.69042

**60. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-14.pg

Find the lengths of the three sides of the triangle  $ABC$  in  $\mathbb{R}^3$  if  $A = (-2, 1, -2)$ ,  $B = (-2, 0, 1)$  and  $C = (2, 1, -2)$ . Enter your answers as a comma separated list.

\_\_\_\_\_ help (numbers)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- 3.16228, 4, 5.09902

**61. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-30a.pg

Find a fully reduced equation for the set of all points in  $\mathbb{R}^3$  (i.e.,  $xyz$ -space) that are equidistant from the points  $A = (0, -2, -5)$  and  $B = (-1, 4, 3)$ . Recall that a point  $P = (x, y, z)$  is equidistant from  $A$  and  $B$  if  $d(P, A) = d(P, B)$ . Plot a graph of this set of points and describe this set geometrically.

\_\_\_\_\_ help (equations)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $12y - 2x + 16z = -3$

**62. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-30a.pg

Find a fully reduced equation for the set of all points in  $\mathbb{R}^3$  (i.e., xyz-space) that are equidistant from the points  $A = (-4, -2, 4)$  and  $B = (5, -5, -4)$ . Recall that a point  $P = (x, y, z)$  is equidistant from  $A$  and  $B$  if  $d(P, A) = d(P, B)$ . Plot a graph of this set of points and describe this set geometrically.

\_\_\_\_\_ help (equations)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $18x - 6y - 16z = 30$

**63. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-24.pg

Let  $A = (3, 3, 0, -3)$  and  $B = (1, -4, 3, -4)$  be points in  $\mathbb{R}^4$ .

(1) Find the vector  $\vec{AB}$  in  $\mathbb{R}^4$ .

\_\_\_\_\_ help (vectors)

(2) Find a vector in the direction of  $\vec{AB}$  that is 5 times as long as  $\vec{AB}$ .

\_\_\_\_\_ help (vectors)

(3) Find a vector in the direction opposite  $\vec{AB}$  that is 5 times as long as  $\vec{AB}$ .

\_\_\_\_\_ help (vectors)

(4) Find a unit vector in the direction of  $\vec{AB}$ .

\_\_\_\_\_ help (vectors)

(5) Find a vector in the direction of  $\vec{AB}$  that has length 5.

\_\_\_\_\_ help (vectors)

Answer(s) submitted:

- 
- 
- 
- 
- 

(incorrect)

Correct Answers:

- $\langle -2, -7, 3, -1 \rangle$
- $\langle -10, -35, 15, -5 \rangle$
- $\langle 10, 35, -15, 5 \rangle$
- $\langle -0.251976, -0.881917, 0.377964, -0.125988 \rangle$
- $\langle -1.25988, -4.40959, 1.88982, -0.629941 \rangle$

**64. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-31b.pg

(a) What is the distance from an arbitrary point  $(x, y)$  in  $\mathbb{R}^2$  to the  $x$ -axis?

(b) Find a fully simplified equation for the set of all points  $P = (x, y)$  equidistant from the  $x$ -axis and the point  $(2, -3)$ . Plot a graph of this set of points and describe this set geometrically.

$y =$  \_\_\_\_\_ help (formulas)

On paper, plot a graph of this set of points. In the box below, describe this set of points geometrically. Explain your answer using complete sentences with correct grammar, spelling and punctuation.

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- $y$
- $[(x-2)^2 + 9] / (-6)$
- Undefined

**65. (1 point)** Library/Hope/Multil/01-02-Vector-operations/Vec  
tors-31b.pg

(a) What is the distance from an arbitrary point  $(x, y)$  in  $\mathbb{R}^2$  to the  $x$ -axis?

(b) Find a fully simplified equation for the set of all points  $P = (x, y)$  equidistant from the  $x$ -axis and the point  $(-3, 5)$ . Plot a graph of this set of points and describe this set geometrically.

$y =$  \_\_\_\_\_ help (formulas)

On paper, plot a graph of this set of points. In the box below, describe this set of points geometrically. Explain your answer using complete sentences with correct grammar, spelling and punctuation.

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- y
- $([x - (-3)]^2 + 25) / 10$
- Undefined

66. (1 point) Library/Hope/Multi1/01-02-Vector-operations/Vectors-10.pg

Let  $A = (-2, -3)$  and  $B = (2, -1)$  be points in  $\mathbb{R}^2$ , and let  $C = (-2, -1, 1)$  and  $D = (3, -4, 3)$  be points in  $\mathbb{R}^3$ .

- (1) Find the distance between  $A$  and  $B$ .  
\_\_\_\_\_ help (numbers)
- (2) Find the distance between  $C$  and  $D$ .  
\_\_\_\_\_ help (numbers)
- (3) Find the distance between the point  $(x, y, z)$  and  $C$ .  
\_\_\_\_\_ help (numbers)
- (4) Find the length of the vector  $\vec{CD}$ .  
\_\_\_\_\_ help (numbers)
- (5) Find the length of the vector  $2\vec{BA}$ .  
\_\_\_\_\_ help (numbers)

Answer(s) submitted:

- 
- 
- 
- 
- 

(incorrect)

Correct Answers:

- $\sqrt{20}$
- $\sqrt{38}$
- $\sqrt{((-2-x)^2 + (-1-y)^2 + (1-z)^2)}$
- $\sqrt{38}$
- $2\sqrt{20}$

67. (1 point) Library/Hope/Multi1/01-02-Vector-operations/Vectors-10.pg

Let  $A = (1, 2)$  and  $B = (-2, -2)$  be points in  $\mathbb{R}^2$ , and let  $C = (2, 1, -4)$  and  $D = (1, -4, 3)$  be points in  $\mathbb{R}^3$ .

- (1) Find the distance between  $A$  and  $B$ .  
\_\_\_\_\_ help (numbers)
- (2) Find the distance between  $C$  and  $D$ .  
\_\_\_\_\_ help (numbers)

- (3) Find the distance between the point  $(x, y, z)$  and  $C$ .  
\_\_\_\_\_ help (numbers)

- (4) Find the length of the vector  $\vec{CD}$ .  
\_\_\_\_\_ help (numbers)

- (5) Find the length of the vector  $2\vec{BA}$ .  
\_\_\_\_\_ help (numbers)

Answer(s) submitted:

- 
- 
- 
- 
- 

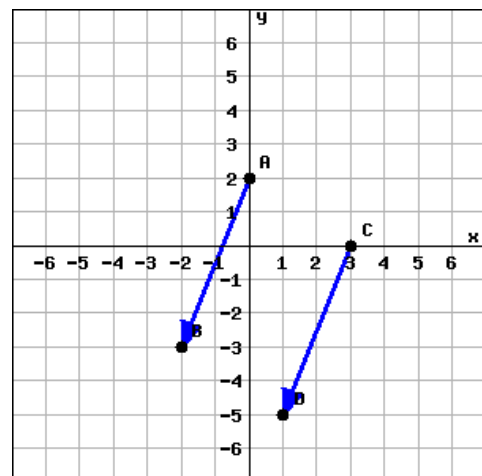
(incorrect)

Correct Answers:

- $\sqrt{25}$
- $\sqrt{75}$
- $\sqrt{(2-x)^2 + (1-y)^2 + (-4-z)^2}$
- $\sqrt{75}$
- $2\sqrt{25}$

68. (1 point) Library/Hope/Multi1/01-01-Vectors-in-Rn/Vectors-01.pg

Are the vectors  $\vec{AB}$  and  $\vec{CD}$  in the figure the same vector? Explain your answer using complete sentences with correct grammar, spelling, and punctuation.

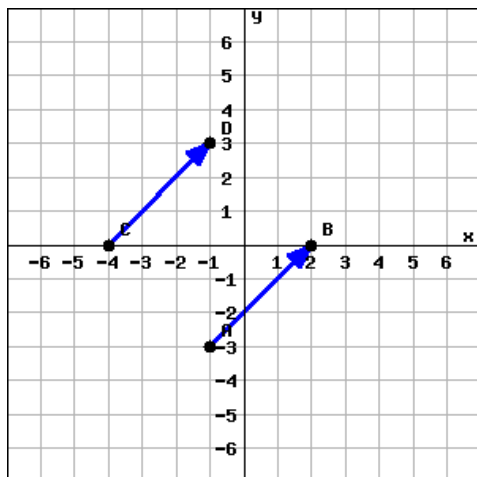


Answer(s) submitted:

•  
(incorrect)  
Correct Answers:  
• Undefined

69. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-01.pg

Are the vectors  $\vec{AB}$  and  $\vec{CD}$  in the figure the same vector? Explain your answer using complete sentences with correct grammar, spelling, and punctuation.



Answer(s) submitted:

•  
(incorrect)  
Correct Answers:  
• Undefined

70. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-18b.pg

Find the vector in  $\mathbb{R}^3$  from point  $A = (x, y, z)$  to  $B = (-5, -1, -8)$ .

$\vec{AB} =$  \_\_\_\_\_ help (vectors)  
Answer(s) submitted:

•  
(incorrect)  
Correct Answers:  
•  $\langle -(5+x), -(1+y), -(8+z) \rangle$

71. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-18b.pg

Find the vector in  $\mathbb{R}^3$  from point  $A = (x, y, z)$  to  $B = (-8, -1, -8)$ .

$\vec{AB} =$  \_\_\_\_\_ help (vectors)  
Answer(s) submitted:

•  
(incorrect)  
Correct Answers:  
•  $\langle -(8+x), -(1+y), -(8+z) \rangle$

72. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-16b.pg

Suppose  $B = (7, -2, 9)$  and  $\vec{AB} = \langle 14, -1, 11 \rangle$ . Then

$A =$  \_\_\_\_\_ help (points)  
Answer(s) submitted:

•  
(incorrect)  
Correct Answers:  
•  $(-7, -1, -2)$

73. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-11.pg

Find a representation of the vector  $\vec{AB} = \langle 5, -1 \rangle$  in  $\mathbb{R}^2$  by giving appropriate values for the points  $A$  and  $B$  such that neither  $A$  nor  $B$  is the origin.

$A =$  \_\_\_\_\_ help (points)  
 $B =$  \_\_\_\_\_ help (points)  
Answer(s) submitted:

•  
(incorrect)  
Correct Answers:  
•  $(-4, 5); (1, 4)$

74. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-18a.pg

Find the vector in  $\mathbb{R}^3$  from point  $A = (2, 4, -3)$  to  $B = (-9, 5, -9)$ .

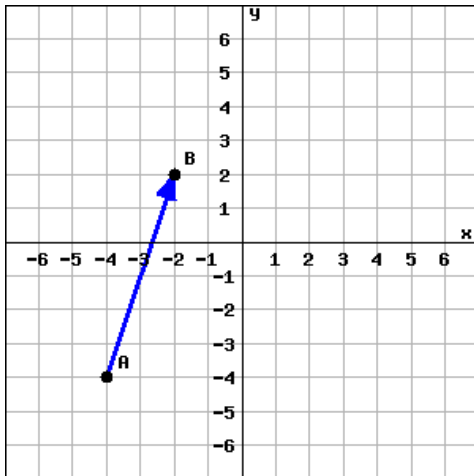
$\vec{AB} =$  \_\_\_\_\_ help (vectors)  
Answer(s) submitted:

•  
(incorrect)  
Correct Answers:  
•  $\langle -11, 1, -6 \rangle$

75. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-02.pg

Find the vector  $\vec{AB}$  in  $\mathbb{R}^2$  given in the figure.

$\vec{AB} =$  \_\_\_\_\_ help (vectors)



Answer(s) submitted:

•

(incorrect)

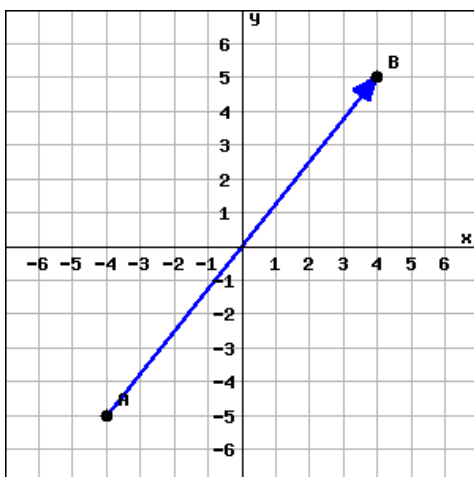
Correct Answers:

•  $\langle 2, 6 \rangle$

76. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-02.pg

Find the vector  $\vec{AB}$  in  $\mathbb{R}^2$  given in the figure.

$\vec{AB} =$  \_\_\_\_\_ help (vectors)



Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\langle 8, 10 \rangle$

77. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-15b.pg

Suppose  $B = (6, -1)$  and  $\vec{AB} = \langle 14, -8 \rangle$ . Then

$A =$  \_\_\_\_\_ help (points)

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $(-8, 7)$

78. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-15b.pg

Suppose  $B = (-9, -3)$  and  $\vec{AB} = \langle -14, -12 \rangle$ . Then

$A =$  \_\_\_\_\_ help (points)

Answer(s) submitted:

•

(incorrect)

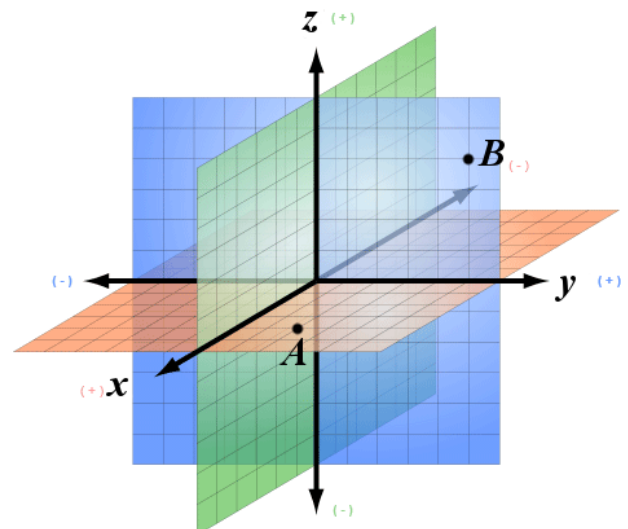
Correct Answers:

•  $(5, 9)$

79. (1 point) Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-06/Vectors-06.pg

Find the vector  $\vec{AB}$ . Assume that the grids are unit grids, that both points are on a grid, that point  $A$  is in a horizontal plane, and that point  $B$  is in a vertical plane.

$\vec{AB} =$  \_\_\_\_\_ help (vectors)



Answer(s) submitted:

•

(incorrect)

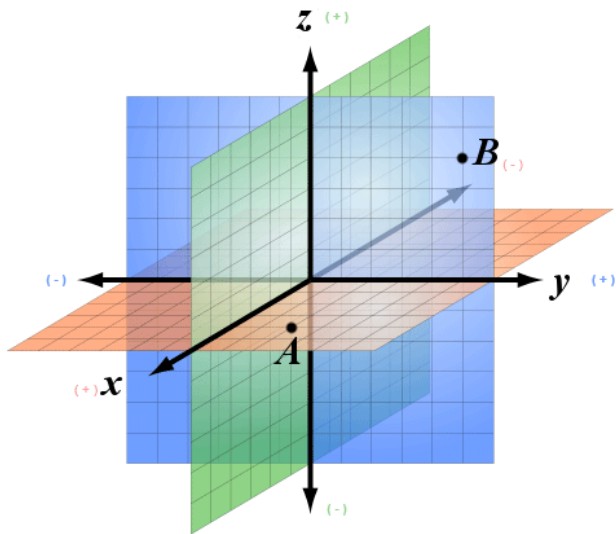
Correct Answers:

- $\langle -4, 3, 4 \rangle$

**80. (1 point)** Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-06/Vectors-06.pg

Find the vector  $\vec{AB}$ . Assume that the grids are unit grids, that both points are on a grid, that point  $A$  is in a horizontal plane, and that point  $B$  is in a vertical plane.

$\vec{AB} =$  \_\_\_\_\_ help (vectors)



Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle -4, 3, 4 \rangle$

**81. (1 point)** Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-20.pg

Find the vector in  $\mathbb{R}^3$  from point  $A = (6, -7, 8)$  to  $B = (0, 0, 0)$ .

$\vec{AB} =$  \_\_\_\_\_ help (vectors)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle -6, 7, -8 \rangle$

**82. (1 point)** Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-20.pg

Find the vector in  $\mathbb{R}^3$  from point  $A = (5, 8, -2)$  to  $B = (0, 0, 0)$ .

$\vec{AB} =$  \_\_\_\_\_ help (vectors)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle -5, -8, 2 \rangle$

**83. (1 point)** Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-17a.pg

Find the vector in  $\mathbb{R}^2$  from point  $A = (9, -8)$  to  $B = (6, 2)$ .

$\vec{AB} =$  \_\_\_\_\_ help (vectors)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle -3, 10 \rangle$

**84. (1 point)** Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-17b.pg

Find the vector in  $\mathbb{R}^2$  from point  $A = (1, 4)$  to  $B = (x, y)$ .

$\vec{AB} =$  \_\_\_\_\_ help (vectors)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle x-1, y-4 \rangle$

**85. (1 point)** Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-16a.pg

Suppose  $A = (-3, -5, 4)$  and  $\vec{AB} = \langle 5, -1, 3 \rangle$ . Then

$B =$  \_\_\_\_\_ help (points)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle 2, -6, 7 \rangle$

**86. (1 point)** Library/Hope/Multil/01-01-Vectors-in-Rn/Vectors-15a.pg

Suppose  $A = (6, -6)$  and  $\vec{AB} = \langle 2, 11 \rangle$ . Then

$B =$  \_\_\_\_\_ help (points)

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle 8, 5 \rangle$



87. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_24.pg

Determine whether the given vectors are *orthogonal*, *parallel*, or *neither*.

- choose one
- Orthogonal
- Parallel
- Neither

1.  $\mathbf{v} = \langle 1, 2, -1 \rangle$  and  $\mathbf{w} = \langle -8, -16, 8 \rangle$ .

- choose one
- Orthogonal
- Parallel
- Neither

2.  $\mathbf{v} = \langle 2, 8, 14 \rangle$  and  $\mathbf{w} = \langle 8, -2, 0 \rangle$ .

- choose one
- Orthogonal
- Parallel
- Neither

3.  $\mathbf{v} = \langle 8, 16, -24 \rangle$  and  $\mathbf{w} = \langle -24, 16, 8 \rangle$ .

**Note:** You only have two attempts at this problem.

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- Parallel
- Orthogonal
- Neither

88. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_24.pg

Determine whether the given vectors are *orthogonal*, *parallel*, or *neither*.

- choose one
- Orthogonal
- Parallel
- Neither

1.  $\mathbf{v} = \langle 1, 2, -1 \rangle$  and  $\mathbf{w} = \langle -9, -18, 9 \rangle$ .

- choose one
- Orthogonal
- Parallel
- Neither

2.  $\mathbf{v} = \langle 2, 9, 14 \rangle$  and  $\mathbf{w} = \langle 9, -2, 0 \rangle$ .

- choose one
- Orthogonal
- Parallel
- Neither

3.  $\mathbf{v} = \langle 9, 18, -27 \rangle$  and  $\mathbf{w} = \langle -27, 18, 9 \rangle$ .

**Note:** You only have two attempts at this problem.

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- Parallel
- Orthogonal
- Neither

89. (1 point) Library/Hope/Multil/01-02-Vector-operations/Vec

tors-24.pg

Let  $A = (3, 4, -2, -4)$  and  $B = (1, 3, 4, -2)$  be points in  $\mathbb{R}^4$ .

(1) Find the vector  $\overrightarrow{AB}$  in  $\mathbb{R}^4$ .

\_\_\_\_\_ help (vectors)

(2) Find a vector in the direction of  $\overrightarrow{AB}$  that is 3 times as long as  $\overrightarrow{AB}$ .

\_\_\_\_\_ help (vectors)

(3) Find a vector in the direction opposite  $\overrightarrow{AB}$  that is 3 times as long as  $\overrightarrow{AB}$ .

\_\_\_\_\_ help (vectors)

(4) Find a unit vector in the direction of  $\overrightarrow{AB}$ .

\_\_\_\_\_ help (vectors)

(5) Find a vector in the direction of  $\overrightarrow{AB}$  that has length 3.

\_\_\_\_\_ help (vectors)

Answer(s) submitted:

- 
- 
- 
- 
- 

(incorrect)

Correct Answers:

- $\langle -2, -1, 6, 2 \rangle$
- $\langle -6, -3, 18, 6 \rangle$
- $\langle 6, 3, -18, -6 \rangle$
- $\langle -0.298142, -0.149071, 0.894427, 0.298142 \rangle$
- $\langle -0.894427, -0.447214, 2.68328, 0.894427 \rangle$

90. (1 point) Library/WHFreeman/Holt\_linear\_algebra/Chaps\_1-4

/2.1.23.pg

Solve for the unknowns in the vector equation below.

$$8 \begin{bmatrix} a \\ 0 \end{bmatrix} + 1 \begin{bmatrix} -1 \\ b \end{bmatrix} = \begin{bmatrix} -3 \\ 4 \end{bmatrix}$$

$a =$  \_\_\_\_\_  
 $b =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- -0.25
- 4

91. (1 point) Library/WHFreeman/Holt\_linear\_algebra/Chaps\_1-4/2.1.25.pg

Solve for the unknowns in the vector equation below.

$$7 \begin{bmatrix} 6 \\ a \\ 8 \end{bmatrix} + 9 \begin{bmatrix} -2 \\ 7 \\ b \end{bmatrix} = \begin{bmatrix} c \\ -9 \\ 3 \end{bmatrix}$$

$a =$  \_\_\_\_\_

$b =$  \_\_\_\_\_

$c =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- -10.2857142857143
- -5.8888888888889
- 24

92. (1 point) Library/Michigan/Chap13Sec2/Q21.pg

Two forces, represented by the vectors  $\vec{F}_1 = 8\vec{i} + 10\vec{j}$  and  $\vec{F}_2 = -2\vec{i} + 5\vec{j}$ , are acting on an object. Give a vector  $\vec{F}_3$  representing the force that must be applied to the object if it is to remain stationary.

$\vec{F}_3 =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- -6i-15j

93. (1 point) Library/Michigan/Chap13Sec2/Q21.pg

Two forces, represented by the vectors  $\vec{F}_1 = -10\vec{i} - 4\vec{j}$  and  $\vec{F}_2 = 8\vec{i} + 8\vec{j}$ , are acting on an object. Give a vector  $\vec{F}_3$  representing the force that must be applied to the object if it is to remain stationary.

$\vec{F}_3 =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- 2i-4j

94. (1 point) Library/Michigan/Chap13Sec2/Q19.pg

There are five students in a class. Their scores on the midterm (out of 100) are given by the vector  $\vec{v} = \langle 95, 85, 90, 77, 84 \rangle$ . Their scores on the final (out of 100) are given by  $\vec{w} = \langle 93, 86, 86, 82, 81 \rangle$ . If the final counts twice as much as the midterm, find a vector  $\vec{z}$  giving the total scores (as a percentage) of the students.

$\vec{z} =$  \_\_\_\_\_

Answer(s) submitted:

- 

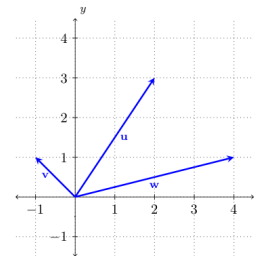
(incorrect)

Correct Answers:

- $\langle 93.6667, 85.6667, 87.3333, 80.3333, 82 \rangle$

95. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_prob01/s\_12\_2\_prob01.pg

Find the following expressions using the graph below of vectors  $\mathbf{u}$ ,  $\mathbf{v}$ , and  $\mathbf{w}$ .



1.  $\mathbf{u} + \mathbf{v} =$  \_\_\_\_\_

2.  $2\mathbf{u} + \mathbf{w} =$  \_\_\_\_\_

3.  $3\mathbf{v} - 6\mathbf{w} =$  \_\_\_\_\_

4.  $|\mathbf{w}| =$  \_\_\_\_\_

**Note:** You can click on the graph to enlarge the image.

Answer(s) submitted:

- 
- 
- 
- 

(incorrect)

Correct Answers:

- $\langle 1, 4 \rangle$
- $\langle 8, 7 \rangle$
- $\langle -27, -3 \rangle$
- 4.12311

96. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_36.pg

Find the scalar and vector projections of  $\mathbf{b}$  onto  $\mathbf{a}$ , where  $\mathbf{a} = \langle 1, 2 \rangle$  and  $\mathbf{b} = \langle -4, 2 \rangle$ .

1.  $\text{comp}_{\mathbf{a}} \mathbf{b} =$  \_\_\_\_\_

2.  $\text{proj}_{\mathbf{a}} \mathbf{b} =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- 0
- $\langle 0, 0 \rangle$

97. (1 point) Library/UMN/calculusStewartET/s\_12\_4\_25.pg

Suppose we have the triangle with vertices  $P(4, 0, 0)$ ,  $Q(0, 8, 0)$ , and  $R(0, 0, 12)$ . Answer the following questions.

1. Find a non-zero vector orthogonal to the plane through the points  $P$ ,  $Q$ , and  $R$ .

Answer: \_\_\_\_\_

2. Find the area of the triangle  $\triangle PQR$ .

Area: \_\_\_\_\_

Answer(s) submitted:

- 
- 

(incorrect)

Correct Answers:

- $\langle 96, 48, 32 \rangle$
- $1/2 * 112$

98. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_6.pg

Find the following expressions if  $\mathbf{a} = \langle 6r, 0, \frac{1}{2}r \rangle$ ,  $\mathbf{b} = \langle 8s, -s, 6s \rangle$ , and  $\mathbf{c} = \langle 3t, 14t, 5 \rangle$ .

1.  $\mathbf{a} \cdot \mathbf{b} =$  \_\_\_\_\_

2.  $\mathbf{a} \cdot \mathbf{c} =$  \_\_\_\_\_

3.  $\mathbf{b} \cdot \mathbf{c} =$  \_\_\_\_\_

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- $8*6*r*s+6*0.5*r*s$
- $3*6*r*t+5*0.5*r$
- $3*8*s*t-14*s*t+5*6*s$

99. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_12.pg

Find a vector  $\mathbf{a}$  with representation given by the directed line segment  $\overrightarrow{AB}$ , where  $A(-5, 0, 1)$  and  $B(1, 8, -3)$ .

$\mathbf{a} =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle 6, 8, -4 \rangle$

100. (1 point) Library/UMN/calculusStewartET/s\_12\_2\_25.pg

Find a unit vector that has the same direction as the vector  $6\mathbf{i} - \mathbf{j} + 2\mathbf{k}$ .

Answer:  $\mathbf{u} =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- $\langle 0.937043, -0.156174, 0.312348 \rangle$

101. (1 point) Library/Dartmouth/setStewartCh13S2/problem\_2.p

g

Let  $\mathbf{a} = \langle -4, 5, 3 \rangle$ .

Find a unit vector in the same direction as  $\mathbf{a}$  having positive first coordinate.

(\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_)

Answer(s) submitted:

- 
- 
- 

(incorrect)

Correct Answers:

- 0.565685424949238
- -0.707106781186547
- -0.424264068711929

102. (1 point) Library/UMN/calculusStewartET/s\_12\_3\_16.pg

Find the angle  $\theta$  between the vectors  $\mathbf{a} = \langle \sqrt{3}, -1 \rangle$  and  $\mathbf{b} = \langle 0, 13 \rangle$ .

Answer (in radians):  $\theta =$  \_\_\_\_\_

Answer(s) submitted:

- 

(incorrect)

Correct Answers:

- 2.0944

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**103. (1 point)** Library/Michigan/Chap13Sec3/Q31.pg

Compute the angle between the vectors  $-\tilde{i} + \tilde{j} - \tilde{k}$  and  $-\tilde{i} - \tilde{j} - \tilde{k}$ .

angle = \_\_\_\_\_ radians

(Give your answer in radians, not degrees.)

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\arccos(1/3)$

---

**104. (1 point)** Library/UMN/calculusStewartET/s\_12\_4\_2.pg

Find the cross product  $\langle -3, 1, 2 \rangle \times \langle 5, 2, 6 \rangle$ .

Answer: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\langle 2, 28, -11 \rangle$

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**105. (1 point)** Library/UMN/calculusStewartET/s\_12\_4\_4.pg

Find the cross product  $(2\mathbf{i} - \mathbf{j} + \mathbf{k}) \times (-3\mathbf{i} - \mathbf{j} - \mathbf{k})$ .

Answer: \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $\langle 2, -1, -5 \rangle$

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**106. (1 point)** Library/UMN/calculusStewartET/s\_12\_4\_13.pg

If  $\mathbf{a} = \langle 1, 2, 1 \rangle$  and  $\mathbf{b} = \langle 11, 5, 1 \rangle$ , find the following cross products.

1.  $\mathbf{a} \times \mathbf{b} =$  \_\_\_\_\_

2.  $\mathbf{b} \times \mathbf{a} =$  \_\_\_\_\_

---

Answer(s) submitted:

•

•

(incorrect)

Correct Answers:

•  $\langle -3, 10, -17 \rangle$

•  $\langle 3, -10, 17 \rangle$

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**107. (1 point)** Library/Michigan/Chap13Sec4/Q05.pg

Use the algebraic definition to find  $\vec{v} \times \vec{w}$  if  $\vec{v} = -\tilde{i} + 2\tilde{j} + \tilde{k}$  and  $\vec{w} = 3\tilde{i} + 3\tilde{j} + 3\tilde{k}$ .

$\vec{v} \times \vec{w} =$  \_\_\_\_\_

Answer(s) submitted:

•

(incorrect)

Correct Answers:

•  $3\mathbf{i} + 6\mathbf{j} - 9\mathbf{k}$

---

**108. (1 point)** Library/Michigan/Chap13Sec1/Q31.pg

(a) Find a unit vector from the point  $P = (3, 1)$  and toward the point  $Q = (7, 4)$ .

$\vec{u} =$  \_\_\_\_\_

(b) Find a vector of length 15 pointing in the same direction.

$\vec{v} =$  \_\_\_\_\_

Answer(s) submitted:

•

•

(incorrect)

Correct Answers:

•  $0.8\mathbf{i} + 0.6\mathbf{j}$

•  $12\mathbf{i} + 9\mathbf{j}$