Given the ordered pairs for the initial and terminal points of each vector, are the two vectors equivalent?

1) A(–1, 3), B(4, 5), C(–5, –2), D(0,0)
$\overrightarrow{AB}$, $\overrightarrow{CD}$

A) No B) Yes

2) A(–5, –5), B(–1, –3), I(2, 2), J(4, 3)
$\overrightarrow{AB}$, $\vec{IJ}$

A) No B) Yes

Solve.

3) Two forces of 589 newtons and 246 newtons act at a point. The resultant force is 667 newtons. Find the angle between the forces.

A) 97.4° B) 164.3° C) 114.3° D) 82.6°

4) Starting at point A, a ship sails 74 km on a bearing of 203°, then turns and sails 36 km on a bearing of 293°. Find the distance of the ship from point A.

A) 110 km B) 82 km C) 8 km D) 118 km

5) A plane is heading due south with an airspeed of 246 mph. A wind from a direction of 52° is blowing at 8 mph. Find the bearing of the plane.

A) 89° B) 181° C) 94° D) 176°

6) A wind has an easterly component of 5 km/h and a northerly component of 16 km/h. Find the direction of the wind.

A) 54.5° B) –3.3° C) 72.6° D) 17.4°

Given the magnitudes of vectors u and v and the angle θ between them, find the magnitude of the sum u + v to the nearest tenth and the angle that the sum vector makes with u to the nearest degree.

7) $|\mathbf{u}| = 55$, $|\mathbf{v}| = 55$, $\theta = 14°$

A) 109.2, 14° B) 110, 14° C) 109.2, 7° D) 110, 7°

8) $|\mathbf{u}| = 85$, $|\mathbf{v}| = 85$, $\theta = 10°$

A) 169.4, 5° B) 170, 5° C) 169.4, 10° D) 170, 10°

Solve.

9) What is the minimum force required to prevent a ball weighing 15.1 lb from rolling down a ramp inclined 23.2° with the horizontal?

A) 3 lb B) 13.9 lb C) 7 lb D) 5.9 lb

10) A vector with magnitude of 200 lb is inclined to the left and downward 51° from the horizontal. Resolve the vector into components.

A) Left: 125.9, down: 155.4 B) Left: 257.4, down: 317.8
C) Left: 317.8, down: 257.4 D) Left: 155.4, down: 125.9

11) A luggage wagon is being pulled with vector force **V**, which has a magnitude of 620 lb at an angle of elevation of 65°. Resolve the vector **V** into components.

A) Horizontal: 262, vertical: 561.9
B) Horizontal: 561.9, vertical: 262
C) Horizontal: 684.1, vertical: 1467
D) Horizontal: 1467, vertical: 684.1

Find the component form of the vector given the initial and terminal points.

12) $\overrightarrow{MN}$; M(11, 1), N(8, 10)

A) $\langle 9, -3 \rangle$ B) $\langle -3, 9 \rangle$ C) $\langle 19, 11 \rangle$ D) $\langle 3, -9 \rangle$

Find the length of the vector given the initial and terminal points.

13) $\overrightarrow{MN}$; M(9, 8), N(10, 12)

A) $\sqrt{5}$ B) $\sqrt{17}$ C) 17 D) 5

Find the indicated quantity.

14) Find the magnitude of the vector **u** if $\mathbf{u} = \langle -5, 9 \rangle$.

A) $\sqrt{106}$ B) 7 C) $2\sqrt{14}$ D) 106

15) Find the magnitude of the vector **u** if $\mathbf{u} = \langle 2, 4 \rangle$.

A) 3 B) $2\sqrt{5}$ C) 20 D) $2\sqrt{3}$

Perform the indicated operation.

16) $\mathbf{u} = \langle -7, 3 \rangle$, $\mathbf{v} = \langle -7, 6 \rangle$, $\mathbf{w} = \langle -3, -5 \rangle$
$\mathbf{v} - (2\mathbf{w} + 3\mathbf{u})$

A) $\langle -22, 25 \rangle$ B) $\langle 3, 8 \rangle$ C) $\langle 20, 8 \rangle$ D) $\langle 20, 7 \rangle$

Find the dot product for the given vectors.

17) $\mathbf{u} = \langle 1, 12 \rangle$, $\mathbf{v} = \langle 11, 5 \rangle$

A) 137 B) −49 C) 67 D) 71

18) $\mathbf{u} = \langle 7, -1 \rangle$, $\mathbf{v} = \langle 2, 8 \rangle$

A) 54 B) 6 C) 9 D) 22

Find a unit vector that has the same direction as the given vector.

19) $\mathbf{v} = \langle 8, 15 \rangle$

A) $\left\langle \frac{8}{17}, \frac{15}{17} \right\rangle$ B) $\langle 136, 255 \rangle$ C) $\left\langle \frac{15}{17}, \frac{8}{17} \right\rangle$ D) $\left\langle \frac{17}{8}, \frac{17}{15} \right\rangle$

20) $\mathbf{w} = \langle -9, 8 \rangle$

A) $\left\langle \frac{-9}{\sqrt{145}}, \frac{8}{\sqrt{145}} \right\rangle$ B) $\left\langle \frac{8}{\sqrt{145}}, \frac{-9}{\sqrt{145}} \right\rangle$ C) $\left\langle -\frac{\sqrt{145}}{9}, \frac{\sqrt{145}}{8} \right\rangle$ D) $\langle -9\sqrt{145}, 8\sqrt{145} \rangle$

Express the given vector as a linear combination of the unit vectors i and j.

21) $\mathbf{w} = \langle -3, 10 \rangle$

A) $3\mathbf{i} - 10\mathbf{j}$ B) $-3\mathbf{i} - 10\mathbf{j}$ C) $3\mathbf{i} + 10\mathbf{j}$ D) $-3\mathbf{i} + 10\mathbf{j}$

22) $\mathbf{u} = \langle 2, 9 \rangle$

A) $9\mathbf{i} + 2\mathbf{j}$ B) $9\mathbf{i} - 2\mathbf{j}$ C) $2\mathbf{i} + 9\mathbf{j}$ D) $2\mathbf{i} - 9\mathbf{j}$

Perform the indicated operation.

23) $\mathbf{u} = 5\mathbf{i} + \mathbf{j}$, $\mathbf{v} = -7\mathbf{i} - 4\mathbf{j}$

$6\mathbf{v} - \mathbf{u}$

A) $-47\mathbf{i} - 5\mathbf{j}$ B) $25\mathbf{i} + 47\mathbf{j}$ C) $-37\mathbf{i} + 25\mathbf{j}$ D) $-47\mathbf{i} - 25\mathbf{j}$

Calculate the unit vector $\mathbf{u} = (\cos\theta)\mathbf{i} + (\sin\theta)\mathbf{j}$ for the given direction angle.

24) $\theta = \frac{\pi}{4}$

A) $\frac{\sqrt{3}}{2}\mathbf{i} + \frac{1}{2}\mathbf{j}$ B) $\frac{1}{2}\mathbf{i} + \frac{\sqrt{3}}{2}\mathbf{j}$ C) $\frac{\sqrt{2}}{2}\mathbf{i} - \frac{\sqrt{2}}{2}\mathbf{j}$ D) $\frac{\sqrt{2}}{2}\mathbf{i} + \frac{\sqrt{2}}{2}\mathbf{j}$

Determine the direction angle θ of the vector, to the nearest degree.

25) $\mathbf{u} = \langle 4, 6\rangle$

A) 56° B) 214° C) 34° D) 236°

26) $\mathbf{w} = \langle 1, -8\rangle$

A) −7° B) 353° C) 277° D) 97°

Find the magnitude or direction angle of the given vector as indicated.

27) $\mathbf{u} = 7[(\cos 30°)\mathbf{i} + (\sin 30°)\mathbf{j}]$; Find the magnitude.

A) 14 B) 7 C) $\frac{7}{2}$ D) $\sqrt{7}$

28) $\mathbf{w} = \left\langle \frac{\sqrt{3}}{2}, \frac{1}{2} \right\rangle$; Find the magnitude.

A) $\sqrt{2}$ B) 1 C) $\frac{1}{2}$ D) 2

Find the angle between the given vectors, to the nearest tenth of a degree.

29) $\mathbf{u} = \langle 3, 2\rangle$, $\mathbf{v} = \langle 6, 6\rangle$

A) −11.3° B) 11.3° C) 78.7° D) 101.3°

30) $\mathbf{t} = \langle -2, -6\rangle$, $\mathbf{s} = \langle 1, 2\rangle$

A) 45° B) 8.1° C) −81.9° D) 171.9°

31) $\mathbf{u} = \mathbf{i} - \mathbf{j}$, $\mathbf{v} = 4\mathbf{i} + 5\mathbf{j}$

A) 99° B) 96.3° C) 6.3° D) −6.3°

Express the vector as a product of its magnitude and direction.

32) $4\mathbf{i} + 3\mathbf{j}$

A) $5(\frac{4}{5}\mathbf{i} + \frac{3}{5}\mathbf{j})$ B) $5(20\mathbf{i} + 15\mathbf{j})$ C) $5(\frac{4}{25}\mathbf{i} + \frac{3}{25}\mathbf{j})$ D) $5(\frac{1}{5}\mathbf{i} + \frac{1}{5}\mathbf{j})$

Solve the problem using the vector form $\mathbf{v} = |\mathbf{v}|\,[(\cos\theta)\mathbf{i} + (\sin\theta)\mathbf{j}]$.

33) An airplane has an airspeed of 125 km/h. It is to make a flight in a direction of 305° while there is a 30 − km/h wind from 210°. What will the airplane's actual heading be?

A) 283° B) 292° C) 318° D) 107°

Answer Key
Testname: MATH140STUDYGUIDEII

1) B
2) A
3) D
4) B
5) B
6) C
7) C
8) A
9) D
10) A
11) A
12) B
13) B
14) A
15) B
16) D
17) D
18) B
19) A
20) A
21) D
22) C
23) D
24) D
25) A
26) C
27) B
28) B
29) B
30) D
31) B
32) A
33) C