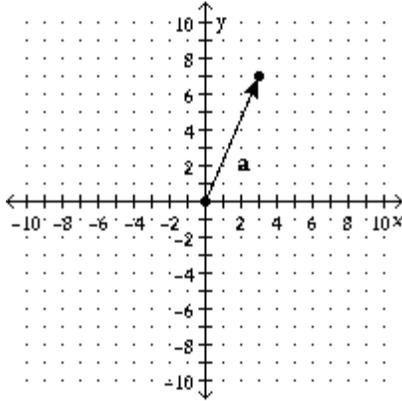


Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the figure to find the specified vector.

1) Find $-a$.



- A) $\langle 7, -3 \rangle$ B) $\langle -3, -7 \rangle$ C) $\langle -7, -3 \rangle$ D) $\langle -3, 7 \rangle$

Determine whether the given vectors are orthogonal.

2) $3i - 4j$ and $-8i - 6j$

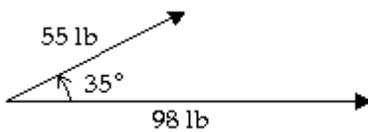
- A) No B) Yes

3) $\langle -2, \sqrt{3} \rangle$ and $\langle -2\sqrt{3}, -4 \rangle$

- A) No B) Yes

Use the parallelogram rule to find the magnitude of the resultant force for the two forces shown in the figure. Round to one decimal place.

4)



- A) 132.7 lb B) 21,459.5 lb C) 146.5 lb D) 180.3 lb

Write the vector in the form $ai + bj$. Round a and b to 3 decimal places if necessary.

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

- A) $-8i + 2j$ B) $8i + 2j$ C) $2i - 8j$ D) $2i + 8j$

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

6) $a = 4i - 4j$, $b = 2i - 9j$

- A) 33.5° B) 66.3° C) 32.5° D) 122.5°

Solve the problem.

7) If $u = \langle -5, 3 \rangle$ and $v = \langle -9, -6 \rangle$, and $w = \langle -3, 12 \rangle$; evaluate $u \cdot w + v \cdot w$.

- A) 2 B) 11 C) 6 D) 13

Find the dot product for the given vectors.

8) $\langle 10, 11 \rangle, \langle -4, -4 \rangle$

A) -40

B) -84

C) -44

D) 4

Determine whether the given vectors are orthogonal.

9) $\langle 3, -6 \rangle$ and $\langle -6, -6 \rangle$

A) Yes

B) No

Find the magnitude and direction angle (to the nearest tenth) for each vector. Give the measure of the direction angle as an angle in $[0, 360^\circ]$.

10) $\langle -5\sqrt{3}, 5 \rangle$

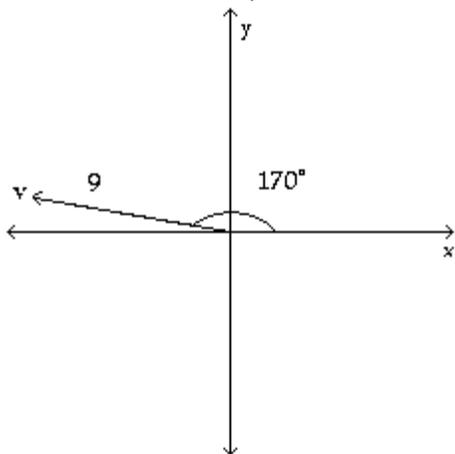
A) 10; 330°

B) 10; 150°

C) 20; 30°

D) 20; 150°

Write the vector in the form $\langle a, b \rangle$.



11)

A) $\approx \langle -0.98, 0.17 \rangle$

B) $\approx \langle -8.86, 1.56 \rangle$

C) $\approx \langle -9, 1.58 \rangle$

D) $\approx \langle -8.46, 3.08 \rangle$

Find the magnitude and direction angle (to the nearest tenth) for each vector. Give the measure of the direction angle as an angle in $[0, 360^\circ]$.

12) $\langle \sqrt{5}, -1 \rangle$

A) 6; 335.9°

B) $\sqrt{6}$; 335.9°

C) 6; 114.1°

D) $\sqrt{6}$; 294.1°

Solve the problem.

13) Two people are carrying a box. One person exerts a force of 123 pounds at an angle of 47.9° with the horizontal. The other person exerts a force of 94 pounds at an angle of 54.6° . Find the weight of the box.

A) 217 lb

B) 103 lb

C) 255 lb

D) 170 lb

14) A pilot wants to fly on a bearing of 63.2° . By flying due east, he finds that a 52-mph wind, blowing from the south, puts him on course. Find the ground speed of the plane.

A) 173 mph

B) 231 mph

C) 115 mph

D) 58 mph

15) Suppose you would like to cross a 202-foot wide river in a boat. Assume that the boat can travel 37 mph relative to the water and that the current is flowing west at the rate of 6 mph. What bearing should be chosen so that the boat will land at a point exactly across from its starting point? Give your answer to the nearest tenth of a degree.

A) 6.2°

B) 9.3°

C) 7.5°

D) 80.7°

- 16) Two forces of 424 newtons and 186 newtons act at a point. The resultant force is 492 newtons. Find the angle between the forces.
 A) 79.9° B) 100.1° C) 79.3° D) 166.4°
- 17) A plane is heading due south with an airspeed of 239 mph. A wind from a direction of 53° is blowing at 10 mph. Find the bearing of the plane.
 A) 88° B) 93° C) 177° D) 182°
- 18) A force of 504 lb is required to pull a boat up a ramp inclined at 26° with the horizontal. How much does the boat weigh?
 A) 1603 lb B) 453 lb C) 478 lb D) 1150 lb

Find the magnitude and direction angle (to the nearest tenth) for each vector. Give the measure of the direction angle as an angle in $[0,360^\circ]$.

- 19) $\langle -4\sqrt{3}, 4 \rangle$
 A) 8; 150° B) 16; 150° C) 16; 30° D) 8; 330°

Vector v has the given magnitude and direction. Find the magnitude of the indicated component of v .

- 20) $\alpha = 59.0^\circ$, $|v| = 21.9$
 Find the horizontal component of v .
 A) 7.5 B) 18.8 C) 11.3 D) 30.1