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## True/False

Indicate whether the statement is true or false.
$\qquad$ 1. Length is a vector quantity.
2. A true bearing of $190^{\circ}$ may also be expressed as a vector bearing of $\mathrm{S} 10^{\circ} \mathrm{W}$.
3. If ABCD is a square with side lengths of $7 \mathrm{~cm}, \overrightarrow{\mathrm{AB}}=\overrightarrow{\mathrm{CD}}$.

4. To find the sum of two vectors that have their tails at a vertex, use a parallelogram. The resultant is one of the diagonals of the parallelogram.
5. To subtract two vectors, simply add the opposite of the second vector.

## Multiple Choice

Identify the choice that best completes the statement or answers the question.
$\qquad$ 6. Which of the following is a vector quantity?
a. age
c. volume
b. time
d. weight
$\qquad$ 7. An aircraft is flying on a path heading $\mathrm{S} 22^{\circ} \mathrm{E}$. The true bearing is
a. $68^{\circ}$
b. $158^{\circ}$
c. $220^{\circ}$
d. $322^{\circ}$
$\qquad$ 8. A true bearing of $250^{\circ}$ may also be expressed as a vector bearing of
a. $\mathrm{N} 70^{\circ} \mathrm{E}$
b. $\mathrm{N} 70^{\circ} \mathrm{W}$
c. $\mathrm{S} 70^{\circ} \mathrm{E}$
d. $S 70^{\circ} \mathrm{W}$
$\qquad$ 9. Jane walks from the math classroom to the cafeteria. At the same time, Norma walks from the cafeteria to the math classroom. The vectors representing their walks are
a. equal in magnitude and opposite in direction
b. equal in magnitude and the same direction
c. unequal in magnitude and opposite in direction
d. unequal in magnitude and the same direction
10. What conditions are necessary for two vectors to be considered equal?
a. different magnitudes and same direction
b. different magnitudes and different directions
c. same magnitude and different directions
d. same magnitude and same direction
11. The opposite of 200 km north is
a. 200 km east
b. 200 km north
c. 200 km south
d. 200 km west
12. The difference between a vector and a scalar is
a. the scalar can be large
c. the vector can be large
b. the scalar has direction
d. the vector has direction
13. A cable exerts a force of 350 N at an angle of $22^{\circ}$ with the horizontal. The horizontal component of this force, to the nearest newton, is
a. $\quad 131 \mathrm{~N}$
b. $\quad 132 \mathrm{~N}$
c. 325 N
d. 324 N
14. An aircraft is climbing at an angle of $2.6^{\circ}$ from the horizontal at an airspeed of $520 \mathrm{~km} / \mathrm{h}$. What is the vertical rate of climb of the aircraft, to the nearest kilometre per hour?
a. $23 \mathrm{~km} / \mathrm{h}$
b. $24 \mathrm{~km} / \mathrm{h}$
c. $518 \mathrm{~km} / \mathrm{h}$
d. $519 \mathrm{~km} / \mathrm{h}$
15. Given the diagram with vectors $\vec{a}, \vec{b}, \vec{c}, \vec{d}, \vec{e}$, and $\vec{f}$, which of the following is true?

a. $\vec{a}+\vec{b}=\vec{c}$
b. $\vec{a}+\vec{b}=\vec{d}$
c. $\vec{a}+\vec{b}=\vec{e}$
d. $\vec{a}+\vec{b}=\vec{f}$

Answer the following questions using this diagram.

16. The resultant when vectors $\overrightarrow{\mathrm{AB}}, \overrightarrow{\mathrm{GF}}$, and $\overrightarrow{\mathrm{HG}}$ are added is
a. $\overrightarrow{\mathrm{AD}}$
c. $\overrightarrow{\mathrm{AG}}$
17. The resultant when vectors $\overrightarrow{F E}, \overrightarrow{F G}, \overrightarrow{H A}$, and $\overrightarrow{D C}$ are added is
a. $\overrightarrow{\mathrm{FA}}$
b. $\overrightarrow{\mathrm{FB}}$
c. $\overrightarrow{\mathrm{FC}}$
d. $\overrightarrow{\mathrm{FH}}$
18. Given the diagram, the resultant of $\overrightarrow{\mathrm{AB}}-\overrightarrow{\mathrm{CB}}$ is

a. $\overrightarrow{\mathrm{AB}}$
b. $\overrightarrow{\mathrm{AC}}$
c. $\overrightarrow{\mathrm{AD}}$
d. $\overrightarrow{\mathrm{HA}}$

Use the diagram to answer the following questions.
$\vec{b}$

19. The resultant of $\vec{a}-\vec{b}$ can be written as
a. $-\vec{f}$
b. $-\vec{e}$
c. $\vec{e}$
d. $\vec{f}$
20. The resultant of $\vec{a}-\vec{e}$ can be written as
a. $-\vec{c}$
b. $-\vec{b}$
c. $\vec{b}$
d. $\vec{c}$
21. A force of 10 N is acting on an object at a $36^{\circ}$ angle and a force of 22 N is acting on the same object at a $54^{\circ}$ angle. With what magnitude of force will the object move, to the nearest newton?
22. An airplane is flying at an airspeed of $600 \mathrm{~km} / \mathrm{h}$, on a heading of $210^{\circ}$. A $120-\mathrm{km} / \mathrm{h}$ wind is blowing from a bearing of $110^{\circ}$. Determine the groundspeed of the airplane, to the nearest kilometre per hour.
23. Gabriella can swim at $0.7 \mathrm{~m} / \mathrm{s}$ in a pool. She heads directly across a river with a current of $0.5 \mathrm{~m} / \mathrm{s}$. Determine Gabriella's actual speed, to the nearest tenth of a metre per second, and her direction relative to the shore, to the nearest degree.
24. A golf ball is hit at a speed of $140 \mathrm{~km} / \mathrm{h}$ in a direction $\mathrm{N} 33^{\circ} \mathrm{W}$. It is acted upon by wind from the east of speed $22 \mathrm{~km} / \mathrm{h}$. Determine the resultant speed of the ball, to the nearest kilometre per hour, and the direction of the ball, to the nearest degree.

