Q1. Temperature is considered as:

A) Vector quantity.
B) Scalar quantity.
C) All of the above
D) None of the above

Q2. Multiplying a vector by −6 results in:

a) An increase in its magnitude by a factor of 6 and a reversal of its direction.
b) A decrease in its magnitude by a factor of 6 and a reversal of its direction.
c) An increase in its magnitude by a factor of 6.
d) An increase in its angle by a factor of 6.

Q3. What is the direction angle of the vector $\vec{r} = -3\hat{x} + 4\hat{y}$*?*

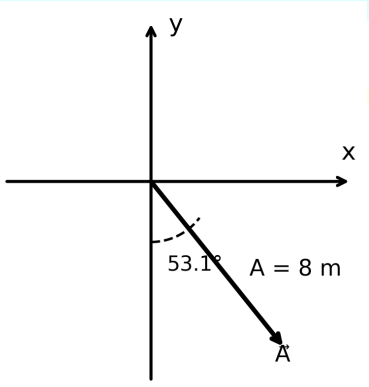
A) $53.1°$
B) $143.1°$
C) $306.9°$
D) $126.9°$

Q4. Vector $\vec{A}$ *has a magnitude of 5 m and is directed 30° below the positive x-axis. Which of the following represents the vector?*

a) $\vec{A} = 4.3\hat{x} - 2.5\hat{y}$
b) $\vec{A} = -4.3\hat{x} + 2.5\hat{y}$
c) $\vec{A} = 2.5\hat{x} - 4.3\hat{y}$
d) $\vec{A} = -2.5\hat{x} + 4.3\hat{y}$

Q5. Which of the following describes the vector shown in the figure?

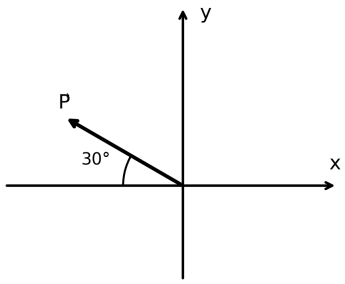
a) $4.8\hat{x} - 6.4\hat{y}$
b) $6.4\hat{x} - 4.8\hat{y}$
c) $-4.8\hat{x} + 6.4\hat{y}$
d) $-6.4\hat{x} + 4.8\hat{y}$



Q6. What is the direction angle of the vector $\vec{A} = -3\hat{x} - 6\hat{y}$*?*

a) *116.6°*
b) *206.6°*
c) *296.6°*
d) *243.4°*

Q7. The vector $\vec{P}$ *shown in the figure has a magnitude of* $P = 50$*. Which of the vectors below is equal to* $\vec{P}$*?*

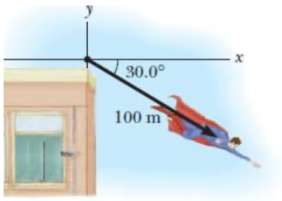


a) $\vec{P} = 43.3\hat{x} + 25\hat{y}$
b) $\vec{P} = -25\hat{x} + 43.3\hat{y}$
c) $\vec{P} = -43.3\hat{x} + 25\hat{y}$
d) $\vec{P} = 25\hat{x} - 43.3\hat{y}$

Q8. Two vectors $\vec{A}$ *and* $\vec{B}$ *are given as* $\vec{A} = 5\hat{x} + 12\hat{y}$ *and* $\vec{B} = -4\hat{x} + 3\hat{y}$*. Calculate the magnitude of the vector* $\vec{C} = 3\vec{A} - 2\vec{B}$*.*

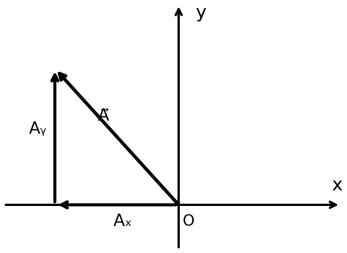
a) *30.8*
b) *53*
c) *47.8*
d) *37.8*

Q9. A superhero flies down from the top of a tall building at an angle of 30° below the horizontal along the path shown. Find the horizontal and vertical components (A_x *and* A_y*) of the 100 m displacement.*



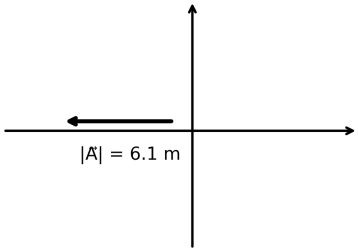
a) $A_x = +86.6\ m$, $A_y = +50\ m$
b) $A_x = +50\ m$, $A_y = -86.6\ m$
c) $A_x = +86.6\ m$, $A_y = -50\ m$
d) $A_x = +58\ m$, $A_y = -68\ m$

Q10. The signs of the vector's components shown in the figure are:



a) $A_x < 0$ and $A_y < 0$
b) $A_x > 0$ and $A_y < 0$
c) $A_x > 0$ and $A_y > 0$
d) $A_x < 0$ and $A_y > 0$

Q11. If vector $\vec{A}$ has a length of 6.1 m and points in the negative x-direction, the x-component of vector $\vec{A}$ is:



a) $\vec{A} = (0\ m)\hat{x}$
b) $\vec{A} = (-6.1\ m)\hat{x}$
c) $\vec{A} = (6.1\ m)\hat{x}$
d) $\vec{A} = (-6.1\ m)\hat{y}$

Q12. When an object travels from the point $\vec{r_i} = (-5\ m)\hat{x} + (14\ m)\hat{y}$ to the point $\vec{r_f} = (25\ m)\hat{x} + (-4\ m)\hat{y}$, then its displacement Δr is:

a) $(-20\ m)\hat{x} + (10\ m)\hat{y}$
b) $(30\ m)\hat{x} + (-18\ m)\hat{y}$
c) $(-1\ m)\hat{x} + (21\ m)\hat{y}$
d) $(-9\ m)\hat{x} + (39\ m)\hat{y}$

Q13. Find the speed and direction of motion for a rainbow trout whose velocity is $\vec{v} = (3.7\ m/s)\hat{x} + (-1.3\ m/s)\hat{y}$.

A) 15.38 m/s, $\theta = -70.6°$
B) 3.92 m/s, $\theta = -19.36°$
C) 2.24 m/s, $\theta = -6°$
D) 2.4 m/s, $\theta = 1°$

Q14. A student rushes into the classroom during a physics final exam with a velocity of $\vec{v} = (4.0\ m/s)\hat{x} + (-2.0\ m/s)\hat{y}$. *Determine the magnitude and direction of the student's velocity.*

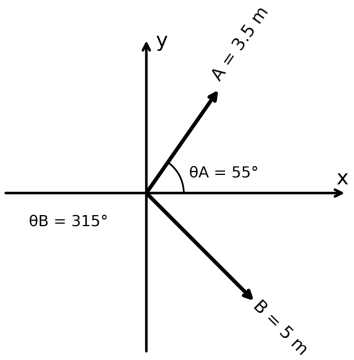
a) $v = 2.5\ m/s,\ \theta = -27°$
b) $v = 3.0\ m/s,\ \theta = 63°$
c) $v = 4.5\ m/s,\ \theta = -27°$
d) $v = 5.3\ m/s,\ \theta = 27°$

Q15. If you multiply the vector $\vec{A} = -3\hat{x} + 4\hat{y}$ *by* -4, *what will be its x-component?*

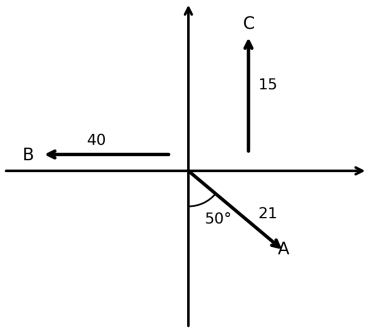
a) -3
b) -4
c) 12
d) 0

Q16. Referring to the vectors in the figure below, solve the following:

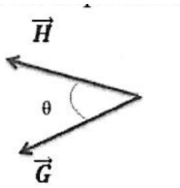
a) *Find the x- and y-components for* $\vec{A}$ *and* $\vec{B}$.
b) *Find the magnitude and direction of vector* $\vec{C}$, *where* $\vec{C} = \vec{A} - \vec{B}$.
c) *Are* $\vec{A} - \vec{B}$ *and* $\vec{B} - \vec{A}$ *equal in magnitude and direction? Explain.*



Q17. If $\vec{D} = \vec{A} + 2\vec{B} - \vec{C}$, *where* $\vec{A}$, $\vec{B}$ *and* $\vec{C}$ *are the three vectors shown in the graph, use the algebraic method to calculate the magnitude and direction of vector* $\vec{D}$.



Q18. When vector $\vec{G}$ is multiplied by vector $\vec{H}$ to yield $\vec{G} \times \vec{H}$, the resultant can be expressed as:



a) *a scalar quantity*
b) *a vector quantity*
c) *equal to zero*
d) *equal to one*

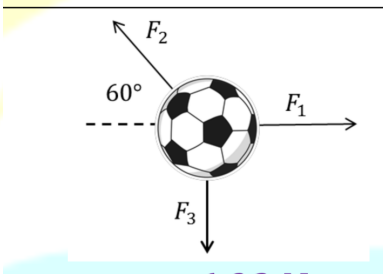
Q19. A dragonfly is initially observed at the position $\vec{r_i} = (-4.50\ m)\hat{x} + (3.00\ m)\hat{y}$. Two seconds later, it is at the position $\vec{r_f} = (2.00\ m)\hat{x} + (8.50\ m)\hat{y}$. What is the dragonfly's average velocity during this time?

a) *$(3.25\ m/s)\hat{x} + (2.75\ m/s)\hat{y}$*
b) *$(-3.25\ m/s)\hat{x} + (5.75\ m/s)\hat{y}$*
c) *$(3.25\ m/s)\hat{x} + (-5.75\ m/s)\hat{y}$*
d) *$(-1.25\ m/s)\hat{x} + (2.75\ m/s)\hat{y}$*

Q20. An insect travels from the position $\vec{r_i} = 6\hat{x} - 2\hat{y}\ m$ to the position $\vec{r_f} = 12\hat{x} + 2\hat{y}\ m$ in 4 seconds. What is the average velocity of the insect in m/s?

a) *$1.5\hat{x} + \hat{y}$*
b) *$4.5\hat{x} - \hat{y}$*
c) *$1.5\hat{x}$*
d) *$-1.5\hat{x} - \hat{y}$*

Q21. Three forces act on a ball as shown, where F_1 = 8 N, F_2 = 16 N, and F_3 = 5 N. What is the magnitude of the net force acting on the ball?



A) *8.86 N*
B) *5 N*
C) *6.93 N*
D) *zero*