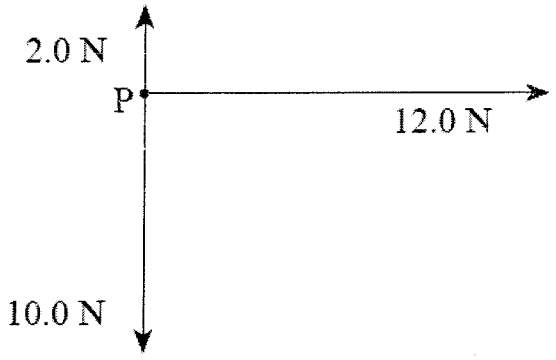
1.

Which one of the following is a vector quantity?

A. time
B. speed
C. energy
D. displacement

2.

Three forces act at point P at the same time, as shown on the force vector diagram below.



What is the magnitude of the resultant force vector?

A. 14.4 N
B. 17.0 N
C. 20.0 N
D. 24.0 N

3.

Which of the following is a vector quantity?

A. work
B. speed
C. acceleration
D. kinetic energy

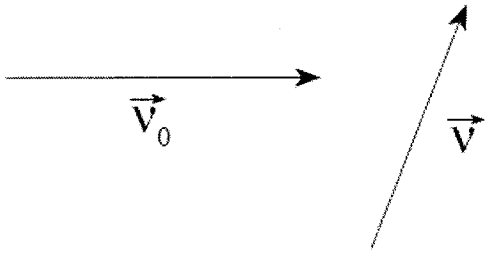
4.

Which of the following is **not** a vector?

A. mass
B. impulse
C. velocity
D. momentum

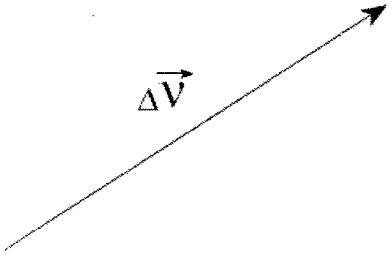
5.

Initial velocity vector $\vec{V}_0$ and final velocity vector $\vec{V}$ are shown below.

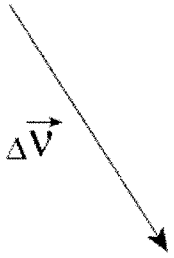


Which of the following represents the change in velocity $\Delta\vec{V}$?

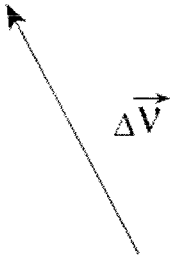
A.



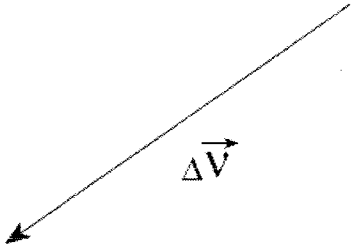
B.



C.



D.



6.

At what speed must a ball be thrown upwards to reach a maximum height of 25 m?

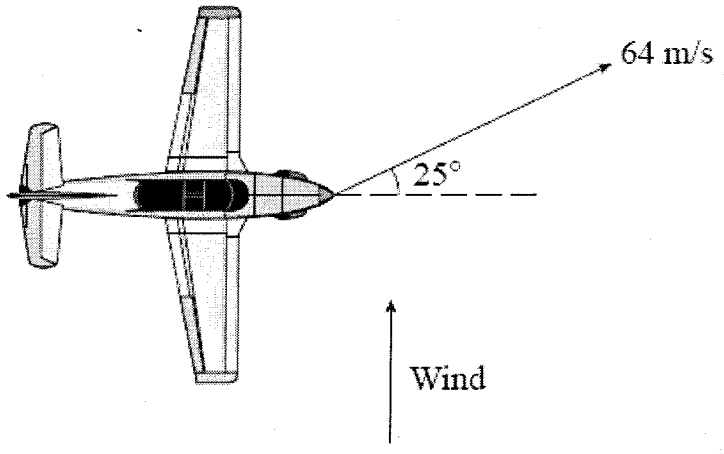
A. 2.6 m/s
B. 22 m/s
C. 2.5×10^{2} m/s
D. 3.1×10^{3} m/s

7.

A skier accelerates uniformly from 5.2 m/s to 12.8 m/s at 0.85 m/s^2. Find the distance she travels.

A. 7.7 m
B. 8.9 m
C. 11 m
D. 80 m

8.
A pilot points an aircraft due east, while the wind blows from the south.



The resultant velocity of the aircraft over the ground is 64 m/s, 25° N of E . At what speed does the wind blow?

A. 2.6 m/s
B. 27 m/s
C. 30 m/s
D. 58 m/s

9.
Which set of quantities contains no vectors?

A. mass, speed, time
B. force, speed, velocity
C. acceleration, force, time
D. acceleration, mass, velocity

10.
An airplane which was flying eastward is later flying southward at the same speed. Which vector shows the airplane's **change** in velocity?

A.

B.

C.

D.

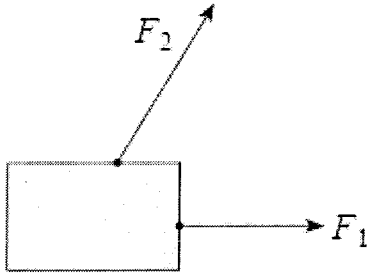
11.

Which of the following statements concerning vector and scalar quantities is **incorrect**?

A. All scalar quantities have direction.
B. All vector quantities have direction.
C. All scalar quantities have magnitude.
D. All vector quantities have magnitude.

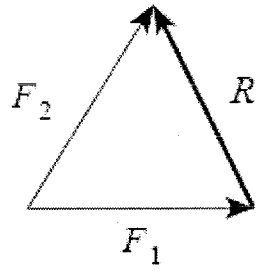
12.

Two forces act on an object as shown in the diagram.

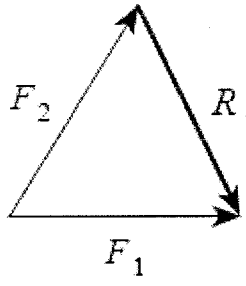


Which of the following **best** shows the resultant R of these forces?

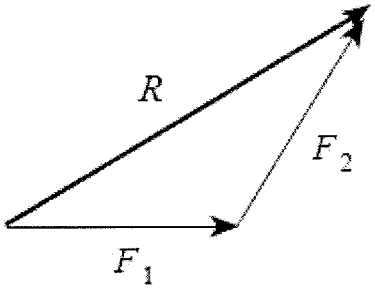
A.



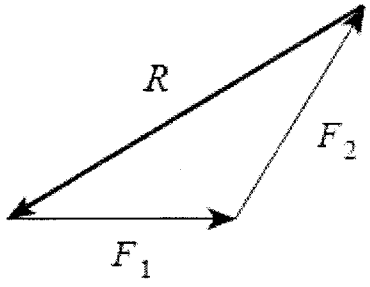
B.



C.



D.



13.

Starting from rest, a jet takes 25 s and needs 1 500 m of runway to become airborne. What is its speed when it leaves the ground?

A. 60 m/s
B. 120 m/s
C. 250 m/s
D. 1 500 m/s

14.

Which list contains three vector quantities?

A. force, mass, speed
B. force, speed, velocity
C. acceleration, mass, velocity
D. acceleration, momentum, velocity

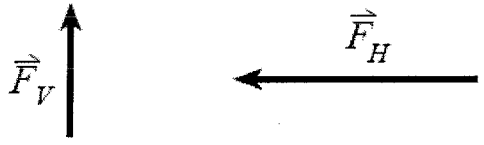
15.

When a 2.0 kg rock is dropped from a cliff it hits the beach at 24 m/s. At what speed would a 4.0 kg rock, dropped from the same cliff, hit the beach? Ignore friction.

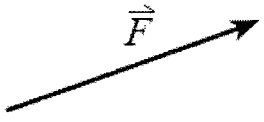
A. 12 m/s
B. 24 m/s
C. 34 m/s
D. 48 m/s

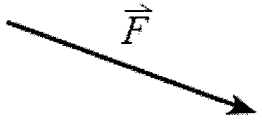
16.

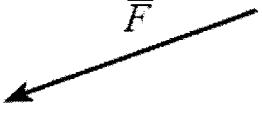
The diagram shows the vertical and horizontal components of a force, $\vec{F}_V$ and $\vec{F}_H$.



Which of the following is their resultant force $\vec{F}$?

A. 

B. 

C. 

D. 

16.

A motorcycle accelerates uniformly from 12 m/s to 30 m/s while travelling 420 m. Its acceleration is

A. $0.043\ m/s^2$

B. $0.050\ m/s^2$

C. $0.10\ m/s^2$

D. $0.90\ m/s^2$

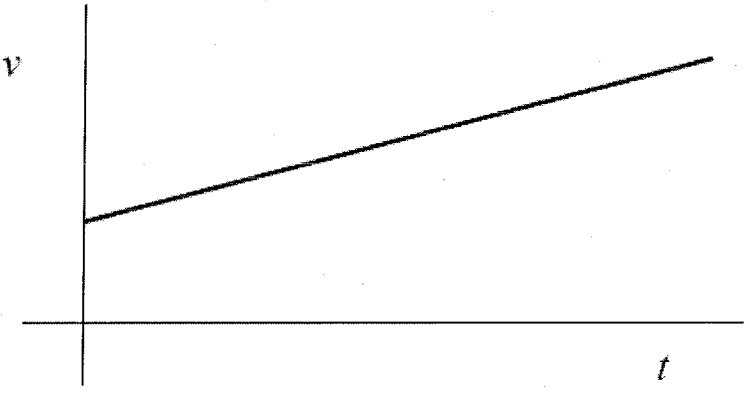
17.

State whether mass and weight are scalar or vector quantities.

	MASS	WEIGHT
A.	Scalar	Scalar
B.	Scalar	Vector
C.	Vector	Scalar
D.	Vector	Vector

18.

The graph shown below displays velocity v versus time t for a moving object.



The slope of this graph represents the object's

A. mass.

B. momentum.

C. acceleration.

D. displacement.

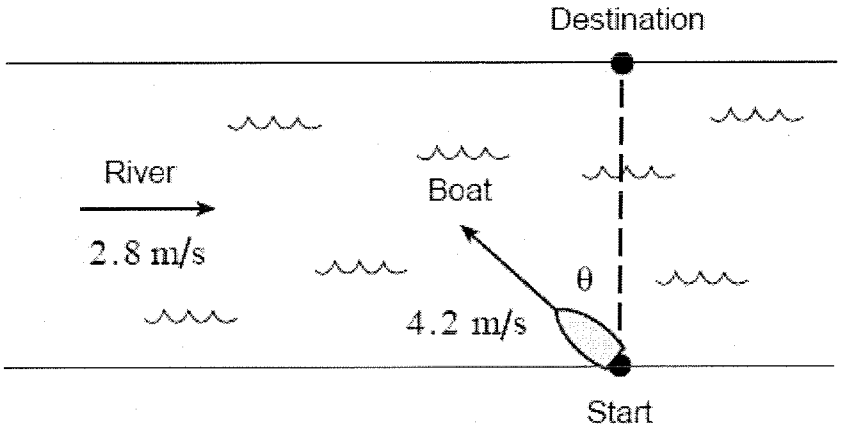
19.

Which of the following is a vector quantity?

A. work
B. electric field
C. kinetic energy
D. potential energy

20.

A boat shown below travels at 4.2 m/s relative to the water, in a river flowing at 2.8 m/s.



At what angle θ must the boat head to reach the destination directly across the river?

A. 34°
B. 42°
C. 48°
D. 56°

21.

A ball is thrown vertically upward at 20 m/s from a height of 30 m above the ground. What is its speed on impact with the ground below?

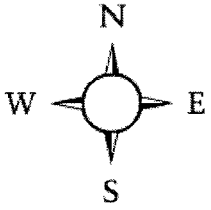
A. 14 m/s
B. 24 m/s
C. 31 m/s
D. 44 m/s

22.

A car travelling north at 20 m/s is later travelling west at 30 m/s. What is the direction of the change in velocity?

A.

B.



C.

D.

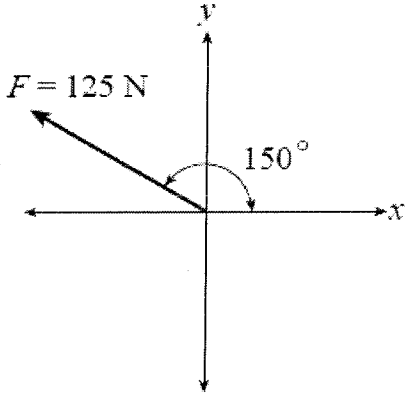
23.

Which of the following situations involves the use of kinematics?

A. Solving a back emf problem
B. Solving a projectile motion problem
C. Determining the internal resistance of a cell
D. Determining the sum of two momentum vectors

24.

Consider the diagram below.



What are the components of the 125 N force?

	x–COMPONENT	y–COMPONENT
A.	−62.5 N	72.2 N
B.	−72.2 N	62.5 N
C.	−62.5 N	108 N
D.	−108 N	62.5 N

25.

A 5.0 kg rock dropped near the surface of Mars reaches a speed of 15 m/s in 4.0 s.

a) What is the acceleration due to gravity near the surface of Mars? **(2 marks)**

26.

Which of the following contains scalar quantities only?

A. speed, energy
B. velocity, energy
C. speed, displacement
D. velocity, momentum

27.

In landing, a jet plane decelerates uniformly and comes to a stop in 38 s, covering a distance of 1 500 m along the runway. What was the jet's landing speed when it first touched the runway?

A. 2.1 m/s
B. 39 m/s
C. 79 m/s
D. 170 m/s

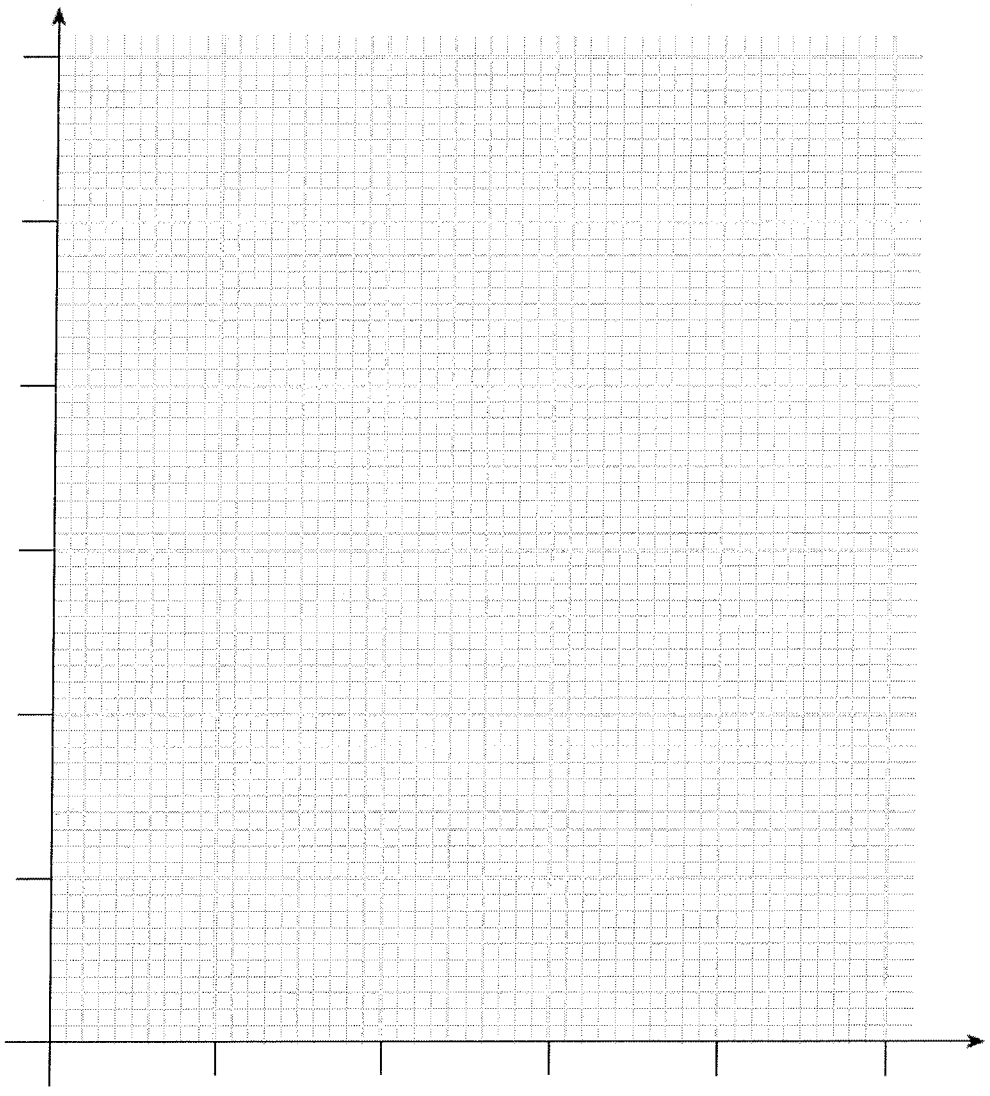
28.

The data table shows the velocity of a car during a 5.0 s interval.

t (s)	0.0	1.0	2.0	3.0	4.0	5.0
v (m/s)	12	15	15	18	20	21

a) Plot the data and draw a best-fit straight line. **(2 marks)**

v (m/s)



b) Calculate the area bounded by the graph and the time axis between $t = 0.0$ s and $t = 5.0$ s. **(2 marks)**

c) What does this area represent? **(1 mark)**

29.

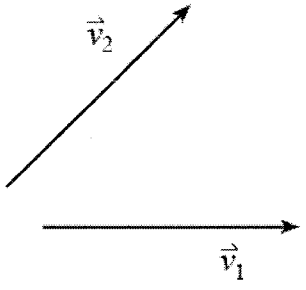
An aircraft heads due south with a speed relative to the air of 44 m/s. Its resultant speed over the ground is 47 m/s. The wind blows from the west.

a) What is the speed of the wind? **(4 marks)**

b) What is the direction of the aircraft's path over the ground? **(3 marks)**

30.

Two velocity vectors, v_1 and v_2 are shown.



Which of the following best represents the resultant of the addition of the two velocity vectors?

A.

B.

C.

D.