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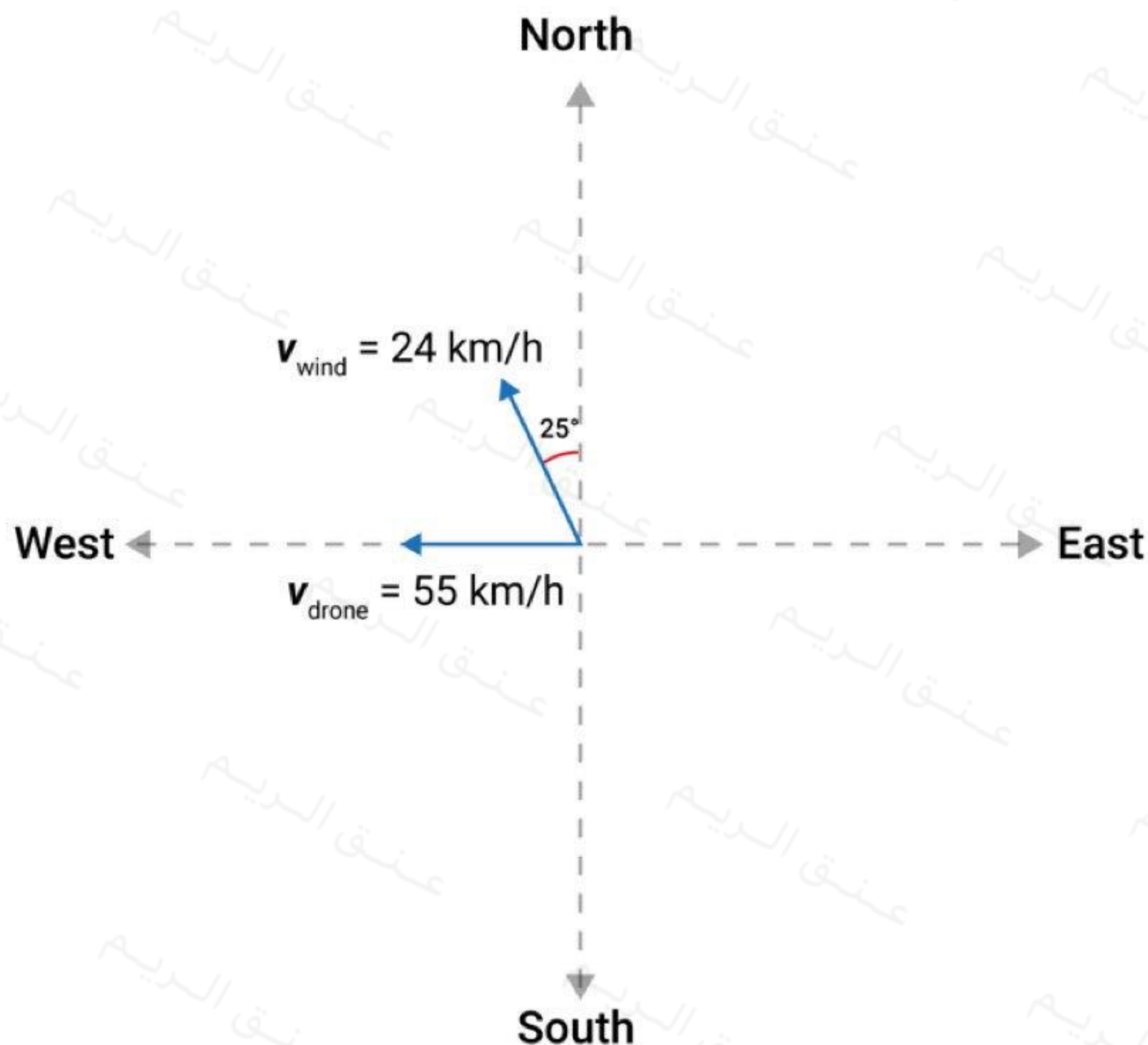
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QUESTION 1



Fill in
the
blank
with the
correct
number.

Bilal is flying a drone at a velocity of 55 km/h to the west while there is a wind blowing to the



northwest (25° to the north) at 24 km/h. The drone's velocity relative to Bilal is

69



km/h, making

18



°

with the direction of west.

(Insert your values as reported to 2 significant figures)

QUESTION 2



Select the correct answers from the drop-down menus.

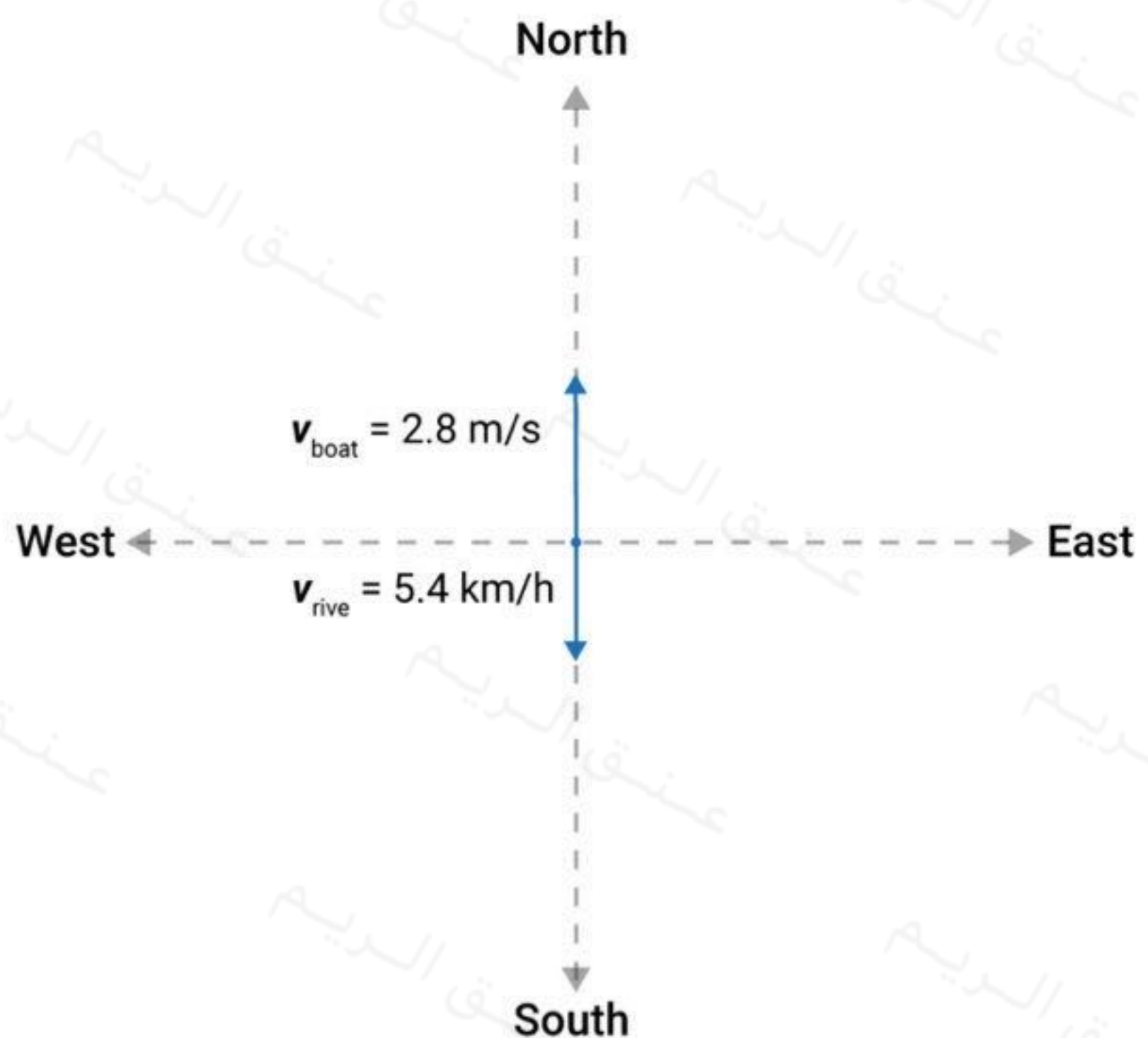
On the bank of a river that flows at a velocity of 5.4 km/h south relative to the ground, Haya stands on the ground watching a fishing boat. The fisherman rows his boat upstream at a velocity of 2.8 m/s relative to the river. The fisherman's velocity relative to

the ground is

1.3 ✓ ▼

m/s,

north ✓ ▼



QUESTION 3



Select the correct answer.

In a shopping mall, Imad takes the escalator to go to a higher floor. Instead of standing still on the escalator, Imad starts walking up at a velocity of 1.2 m/s. If the escalator's velocity is 0.5 m/s, what is Imad's velocity relative to the ground?



☒ 1.7 m/s ✓

☐ 1.3 m/s

☐ 1.1 m/s

☐ 0.7 m/s

QUESTION 4



Select all correct answers.

A seagull is flying west at a velocity of 26 km/h. There is a wind blowing to the north at a velocity of 30 km/h. What is the magnitude of the bird's velocity relative to the ground and its direction with respect to the west?



☒ 40 km/h



☐ 45°

☐ 34°

☐ 29 km/h

☐ 36 km/h

☒ 49°



QUESTION 5



Select all correct answers.

In a football game, a player kicks the ball at 32 km/h, 37° with the field's halfway line. There is a moderate breeze blowing to the



right at a velocity of 14 km/h. What is the ball's velocity relative to a player standing at the halfway line? and what is its direction with respect to the horizontal one?

☒ 38°



44 km/h



43°



28°



38 km/h

☒ 42 km/h



QUESTION 6



Select the correct answer.

Two of your friends, Ziad and Rami, are participating in a road running race and you are watching them. Ziad is running at a velocity of 11 km/h towards the finish line. Rami is running behind Ziad at a lower velocity. His velocity is 2 km/h lower than Ziad's. At which velocity is Rami running relative to you?



☐ 2 km/h

☐ 13 km/h

☒ 9 km/h



☐ 7 km/h

QUESTION 7



Select the correct answer.

While John is walking along the beach, exactly parallel to it, heading from west to east at a velocity of 1.2 m/s and flying his kite, there is a gentle breeze blowing across the beach coming perpendicularly from the sea at a velocity of 16 km/h . What is the kite's velocity relative to a lifeguard sitting in a nearby tower?



☐ 3.2 m/s

☐ 4.4 m/s

☒ 4.6 m/s

☐ 6.1 m/s

QUESTION 8



Select the correct answer.

A 50 kg girl riding a roller-coaster feels as if the car's sides are leaning into her as the car rounds a 12 m radius curve, at a velocity of 40 km/h. Calculate the magnitude of the leaning force that the girl experiences.



☐ 617 N

514 N



407 N



733 N

QUESTION 9



Select the correct answer.

A small ball attached to the end of a 90 cm string is swung in a horizontal circle. Calculate the centripetal acceleration at which the ball is revolving if it completes one circle every 1.23 s.

23.5 m/s²



25.3 m/s²



19.4 m/s²



13.9 m/s²

QUESTION 10



Select the correct answer.

Mark is a hammer throw player. He whirls around a 5 kg sphere attached to the end of a 1.2 m chain moving it in a circular path. After revolving 5 times in 4 seconds, Mark releases his grip on the chain and the "hammer" is launched. Calculate the tension in the chain?



☐ 590 N

☐ 490 N

☒ 370 N

☐ 164 N

QUESTION 11



Select the correct answer.

Which force acts on your sides, that you experience when you drive a car fast around a circular track?



☐ centrifugal 'force'

☐ weight

☒ centripetal force

☐ frictional force

QUESTION 12



Select the correct answer.

A skater riding his skateboard and traveling at 9.2 m/s makes a turn. What is the smallest radius of the circular path the skater can make and keep the centripetal acceleration under 4.5 m/s^2 ?



☐ 21.6 m

☐ 16.6 m

☐ 12.8 m

18.8 m



QUESTION 13



Select the correct answer.

Majed is riding his bicycle along a 25.3 m radius round point. He completes a revolution in 1.8 minutes. Calculate the centripetal force that Majed experiences in his ride along that circular track knowing that the mass of Majed and his bike together is 75 kg.



5.6 N



6.4 N



11.3 N



36.8 N

QUESTION 14



Select the correct answer from the drop-down menu.

The centripetal force acting on a 790 kg racing car that is moving at a speed of 306 km/h as it rounds a 150 m

radius bend is

38 ✓ ▼

kN.



QUESTION 15



Fill in the blank with the correct number.

A small ball attached to a 110 cm string swings in horizontal circles at a velocity of 5.3 m/s. The period of revolution of this ball is

1.3



s.

(Give your answer to two significant figures).



QUESTION 16



Drag and drop the correct answer in the space provided.

Noha placed her cup of tea on the balcony handrail. As she was putting her jacket on, she mistakenly pushed it at 2 m/s horizontally off the handrail, which is at a 32 m height from the ground. Noha heard the crashing sound



2.6



s later.

↕ 2.1

↕ 2.7

↕ 2.2

QUESTION 17



Select the correct answer.

A football is kicked at an angle of 47° to the horizontal with a velocity of 90.0 km/h . Calculate the flight time that the football takes to hit the ground.



3.7 s



4.2 s



10 s



1.75



2.8 s

QUESTION 18



Select the correct answer.

A boy standing on the bank of a river is throwing stones at the other bank that is 6.0 m away. In one trial, he throws a stone at an angle of 75° from the horizontal with a velocity of 15.0 m/s. How far from the other edge of the river will the stone hit the ground again in 3.2 seconds.



12.4 m



1.8 m



4.8 m



6.4 m



QUESTION 19



Select the correct answer.

Fares kicked a stone horizontally from a cliff with a velocity of 13 m/s . It hit the ground 4.7 s later. How high is the cliff from the ground?



☒ 108 m



☐ 161 m

☐ 97 m

☐ 128 m

QUESTION 20



Select the correct answer.

In one of its jumps, a running rabbit jumped with an initial velocity of 4.3 m/s , at an angle of 42° from the horizontal. The rabbit's jump lasted 0.9 seconds in the air. What is the horizontal distance leaped by the rabbit in that jump?



☐ 3.2 m

☐ 1.9 m

☒ 2.9 m

☐ 1.6 m

QUESTION 21



Drag and drop the correct answer in the space provided.

A cyclist riding around a curve with a radius of 40.0 m completes a full revolution in 22 seconds. The cyclist's velocity all around the circular track is

11.4



m/s, whereas his average velocity along a quarter of a revolution is

10.3



m/s.



↕ 14.5

↕ 45.7

↕ 8.8

↕ 13.4

QUESTION 22



Select the correct answer.

Two cars, Car 1 and Car 2, are moving on the same road heading to the same direction and at the same velocity of 80 km/h. Which statement is true?



Relative to the road, Car 2 is at rest.



Relative to a nearby tree, both cars are moving at 40 km/h.



Relative to Car 1, Car 2 is at rest.



Relative to Car 1, Car 2 is moving at 80 km/h.

QUESTION 23



Fill in the blank with the correct number.

In a bicycles race, Cyclist A is riding at a velocity of 7.6 m/s towards the finish line. Cyclist B is riding behind Cyclist A and he is getting closer at a velocity of 0.5 m/s. The velocity of

Cyclist B relative to the ground is m/s.



(Give your answer to 2 significant figures)



QUESTION 24

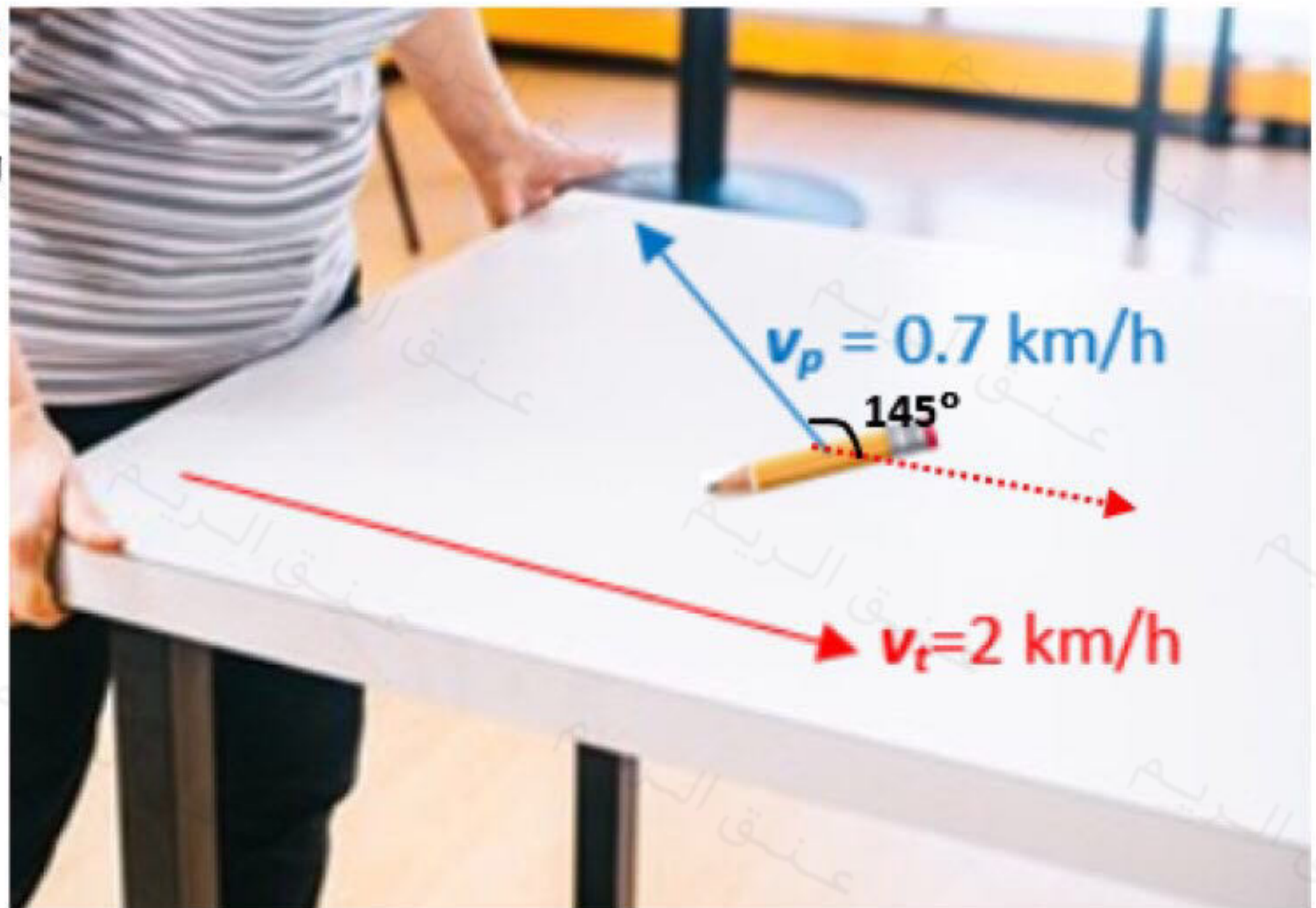


Select the correct answer.

A worker is moving a desk by pushing it slowly forward at 2 km/h.

Meanwhile, a pencil rolls diagonally backwards at a velocity of 0.7 km/h, at an angle of 145° with the direction of the table's motion.

What is the velocity of the pencil relative to the ground?



☐ 2.7 km/h

☐ 1.3 km/h

☒ 1.5 km/h



☐ 1.1 km/h

QUESTION 25



Select the correct answer.

A runner moving at a speed of 7.8 m/s experiences a centripetal force of 285 N, as he is going around a curve with a radius of 16 m. What is the runner's mass?

☐ 78 kg

☐ 85 kg

☒ 75 kg



☐ 82 kg

QUESTION 26



Drag and drop the correct answers in the space provided.

A volleyball player throws a ball at a velocity of m/s, making
with the horizontal an angle of , such that the ball travels 13
m across the court taking 1.8 s to hit the ground.

↕ 10.9

↕ 14.6

↕ 39°

↕ 46°

QUESTION 27



Select the correct answer.

A golfer hits a golf ball at an angle of 40° from the ground. If the horizontal component of the initial velocity is 23.0 m/s, find how far the ball travels away from the golfer when it hits the ground again in 3.9 seconds.

☐ 132 m

☐ 45 m

☒ 90 m



☐ 73 m

QUESTION 28



Select all correct answers.

A tennis player hits a tennis ball that travels 19 m across the field and takes 2.9 seconds to reach the ground. What is the ball's initial velocity? and at what angle is it hit?



☐ 23.7 m/s

☒ 15.6 m/s

☐ $\theta = 48^\circ$

☒ $\theta = 65^\circ$

☐ $\theta = 51^\circ$

☐ 14.4 m/s

QUESTION 29



Fill in the blank with the correct number.

A kangaroo clears a fence by jumping just above it at a velocity of 7.9 m/s, 54° with the ground. If the jump lasts 1.1 s, then the fence is

2.0

m

high.

(Give your answer to 2 significant figures.)



QUESTION 30



Select the correct answer from the drop-down menu.

A boy holds his dart gun 40 cm above the ground. As he fires a dart at 6.9 m/s, 38° to the horizontal, the maximum height reached by the dart, measured from the ground, is

1.32 ✓ ▼ m.

