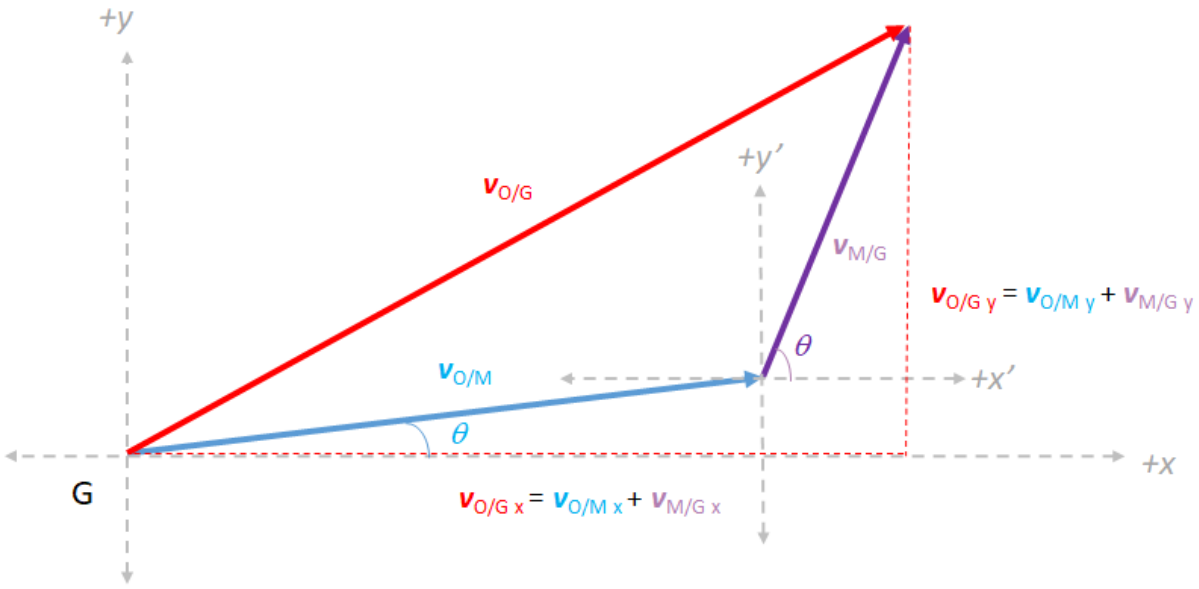
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QUESTION 15



To calculate the magnitude of $v_{O/G}$ I need to use Pythagorean theorem. First, I need to calculate the *x* and *y* components of the vector using the following equations:

- $v_{O/G\,x} = v_{O/M} \sin\theta + v_{M/G} \cos\theta$
  $v_{O/G\,y} = v_{O/M} \sin\theta + v_{M/G} \cos\theta$

- $v_{O/G\,x} = v_{O/M} \cos\theta + v_{M/G} \sin\theta$
  $v_{O/G\,y} = v_{O/M} \cos\theta + v_{M/G} \sin\theta$

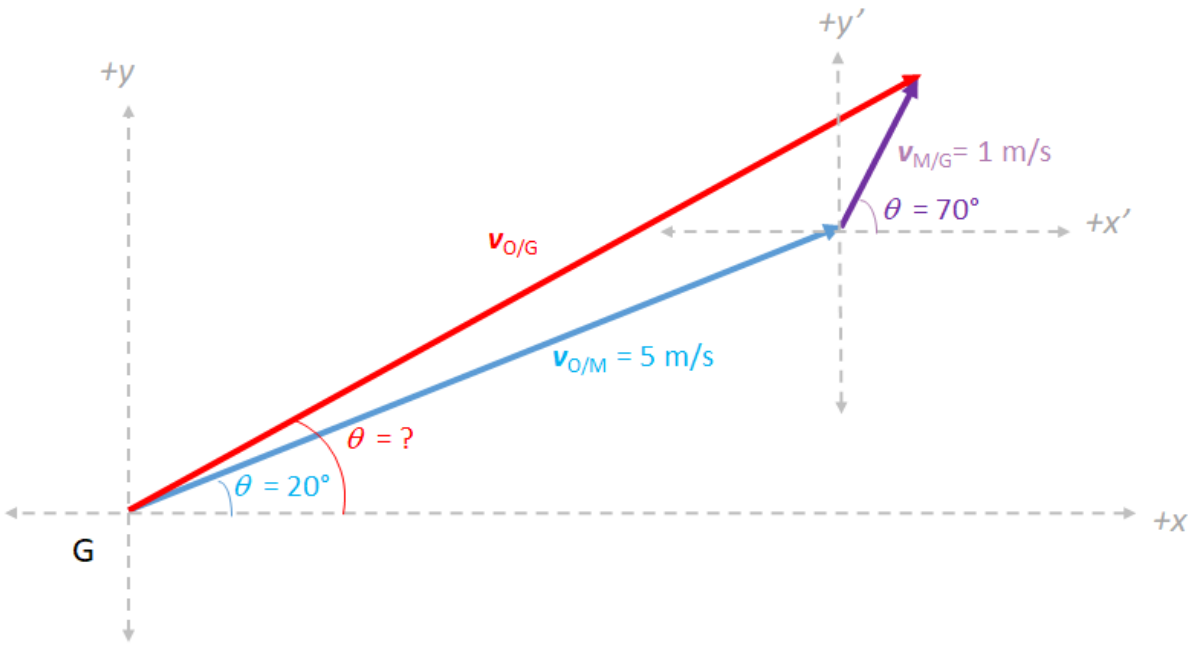
- $v_{O/G\,x} = v_{O/M} \sin\theta + v_{M/G} \sin\theta$
  $v_{O/G\,y} = v_{O/M} \cos\theta + v_{M/G} \cos\theta$

- $v_{O/G\,x} = v_{O/M} \cos\theta + v_{M/G} \cos\theta$

$v_{O/Gy} = v_{O/M} \sin\theta + v_{M/G} \sin\theta$

QUESTION 16

Select the correct answer.



The graph (not to scale) shows the velocity of an object (O) relative to a moving reference frame (M), and the velocity of M relative to the ground reference frame (G). In what orientation will O move relative to G (

$\theta = ?$

)?

- 27.7 °
- 62.3 °

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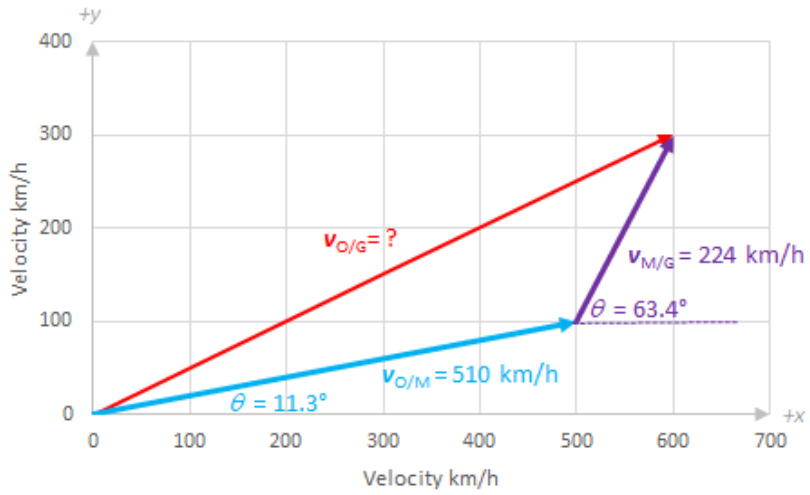
15.3
o

22.3
o

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QUESTION 17





A plane (O) travels at 510 km/h, 11.3
o

north of east relative to a 224 km/h wind (M) that has a direction of 63.4 °

north of east relative to the airport (G). The orientation of the plane's velocity relative to the airport, $v_{O/G}$, measured anticlockwise from the east, is

- 216.6 °
- 36.6 °
- 206.6 °
- 26.6 ° ✓

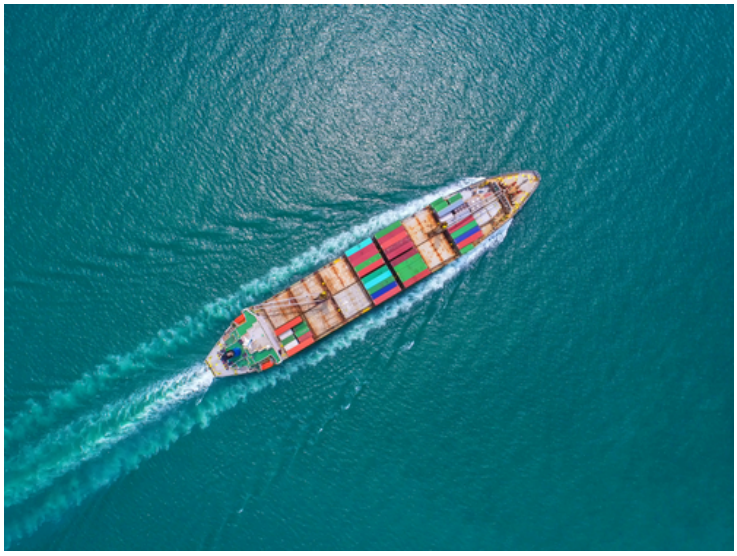
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QUESTION 18

Select the correct answer from the drop-down menu.

This cargo ship sails from Port Zayed at 25 km/h, 20^0 north of east relative to 10 km/h current that has a direction of 15^0 north of east relative to the port. The magnitude of the ship's velocity relative to the port is 35 ✓ km/h.

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QUESTION 19

A bus is driving on the highway at a velocity of 50 km/h. While the driver is changing lanes at an angle of 20^{o} with the assumed positive x-direction, one of its passengers seated next to a window shoots a dart at the other window across the bus. The spring releases the dart at a velocity of 20 km/h making 62^{o} with the positive x-direction. Relative to the ground, what is the velocity of the dart?

- 68 km/h
- 70 km/h
- 62 km/h
- 66 km/h ✓

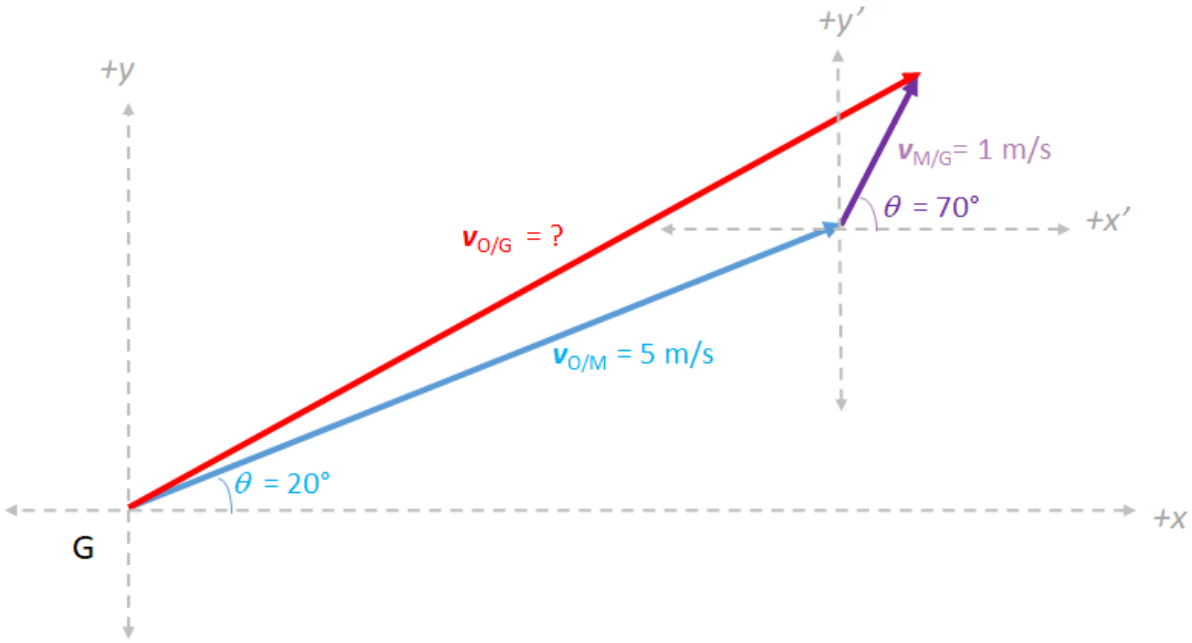
QUESTION 20

https://t.me/+CbbW8n6Up6U5OGE8

While a girl is walking on the beach at a velocity of 2.4 km/h with an angle of 20° towards her father who is standing nearby, she was flying her balloon taking advantage of the wind that is blowing it at a velocity of 6 km/h making an angle of 110° with orientation of the father. Relative to him, the balloon is flying with a velocity of 6.5 km/h.

QUESTION 21

Select the correct answer from the drop-down menu.



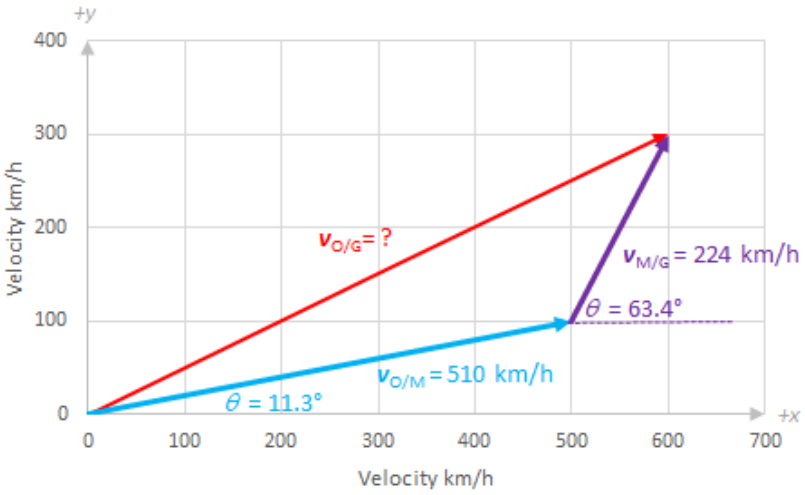
The graph (not to scale) shows the velocity of an object (O) relative to a moving reference frame (M), and the velocity of M relative to the ground reference frame (G). The magnitude of the velocity of O relative to G ($v_{O/G}$) = 5.7 m/s.

QUESTION 22

https://t.me/+CbbW8n6Up6U5OGE8

Select the correct answer from the drop-down menu.





A plane (O) travels at 510 km/h, 11.3
°

north of east relative to a 224 km/h wind (M) that has a direction of 63.4
°

north of east relative to the airport (G).

The magnitude of the plane's velocity relative to the airport, $v_{O/G}$ is 671 ✓ km/h.

While flying a hot air balloon to the east at a velocity of 6.5 km/h, a wind current blows at a velocity of 10.6 km/h making an angle of 15^0 with the east direction. The magnitude of the balloon's vertical velocity component is

2.7 ✓ km/h.



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QUESTION 24

While flying a hot air balloon to the east at a velocity of 6.5 km/h, a wind current blows at a velocity of 10.6 km/h making an angle of 15^0 with the east direction. What is the magnitude of the balloon's horizontal velocity component?

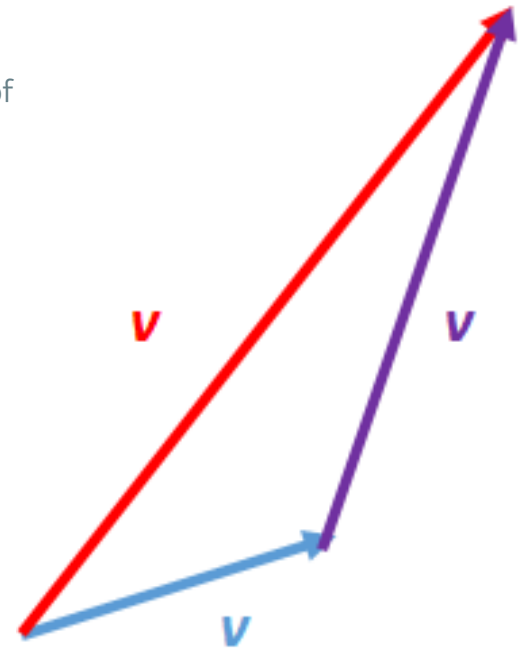


- ○ 17.1 km/h
- ◉ 16.7 km/h ✓
- ○ 14.8 km/h
- ○ 12.3 km/h

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QUESTION 25

If two relative velocity vectors (v and v) are not perpendicular, I would calculate the direction of the v vector in the above diagram by using the following equation:

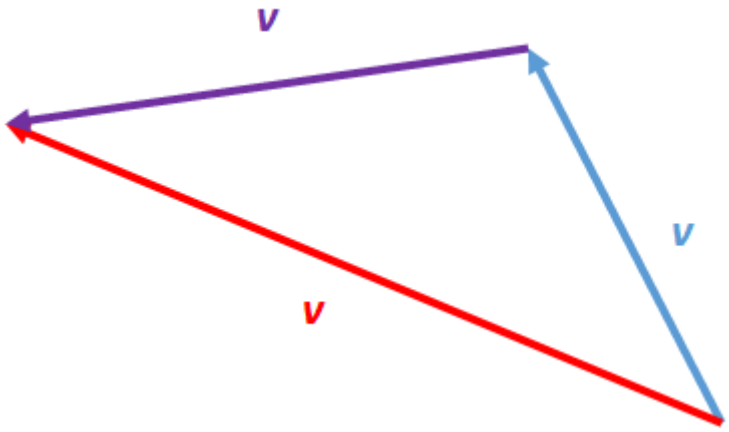


- ◉ $\theta = \tan^{-1}\left(\frac{(v_y + v_y)}{(v_x + v_x)}\right)$ ✓
- ○ $v = \sqrt{v^2 + v^2}$
- ○ $\theta = \tan^{-1}\left(\frac{v_y}{v_x}\right)$
- ○ $\theta = \sqrt{(v_x + v_x)^2 + (v_y + v_y)^2}$

https://t.me/+CbbW8n6Up6U5OGE8

QUESTION 26

If two relative velocity vectors (v and v) are not perpendicular, I would calculate the magnitude of the v vector by using the following equation:



- ◉ $v = \sqrt{(v_x + v_x)^2 + (v_y + v_y)^2}$ ✓
- ○ $v = \sqrt{v^2 + v^2}$
- ○ $v = v + v$
- ○ $v = \tan^{-1}\left(\frac{v_y}{v_x}\right)$

QUESTION 27

Assuming that a given orientation is the positive x-axis, a fish is crossing a river with a velocity of 0.8 m/s making an angle of 75^0 with that assumed positive x-axis and the current

of the river is moving with a velocity of 1.5 m/s. If the streamline of the river makes an angle of 13^0 with the positive x-axis. What is the magnitude of the fish's velocity relative to the river's bank?



- 1.8 m/s
- 1.9 m/s
- 2.0 m/s ✓
- 2.2 m/s

QUESTION 28

While a girl is walking at a velocity of 2.5 km/h towards her mom who is sitting on a nearby bench, she was flying her kite taking advantage of the wind that is blowing at a velocity of 7 km/h making an angle of 85^0 with the girl's direction of motion. What is the magnitude of the kite's velocity relative to the girl's mom?

- 6.9 km/h
- 7.6 km/h ✓

https://t.me/+CbbW8n6Up6U5OGE8

7.4 km/h

7.8 km/h

https://t.me/+CbbW8n6Up6U5OGE8