



Name: _____

Period: _____

Assigned on Wednesday, September 04, 2024

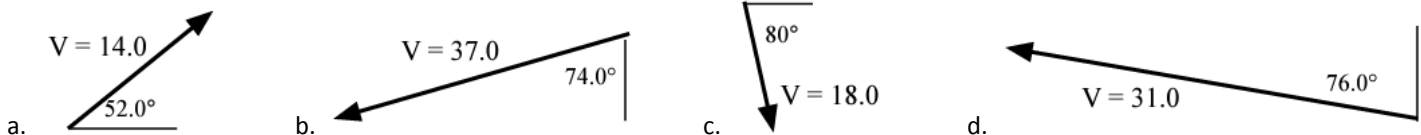
4.3 Practice with Vectors in 2D**Due Friday, September 06, 2024**

1. Calculate the resultant vector (magnitude and direction) for the addition of each of the following pairs of vectors.

a. $\Delta x = +32 \text{ m}$ and $\Delta y = +12 \text{ m}$

b. $\Delta x = -15 \text{ m}$ and $\Delta y = +81 \text{ m}$

2. Calculate the horizontal and vertical components for each of the following vectors. Use up and right as positive and down and left as negative.



3. A car drives 90.0 km directly north in one hour and then turns and drives 100.0 km directly west in one hour and 15 minutes.

a) What is the total distance the car drove?

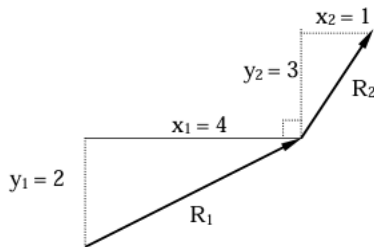
b) What is the car's total displacement for the trip? (magnitude and direction)

c) What was the car's average velocity for the trip? (magnitude and direction)

d) What was the car's average speed for trip?

4. A plane aims north and moves with a velocity of 200 m/s (relative to the air) (v_{PA}). The wind blows to the east at 30 m/s (relative to the ground) (v_{AG}). The plane's velocity relative to the ground (v_{PG}) is equal to the sum of these two velocities ($v_{PG} = v_{PA} + v_{AG}$). Calculate the plane's total velocity (both magnitude and angle from the east axis [also called north of east]).

5. The diagram below shows that if you add the horizontal components of two vectors (R_1 and R_2) and the vertical component of two vectors, you get the two components for the resultant vector. What is the horizontal component and vertical component of the resultant vector? What is the magnitude and angle (from the +x axis) of the resultant vector?



6. Solve for the resultant displacement of the two vectors:

A = 2.3 km @ 45 degrees (from the +x-axis)

B = 4.8 km @ 90 degrees (from the +x-axis)

7. An airplane heads north of west by 18° (this means 18° above the west axis) for a distance of 67 km then heads due north for 39 km. What is the plane's total displacement (remember...magnitude and direction)?

Answers

1. a. 34.2 m b. 82.4 m

2a. x: 8.62 and y: 11.03 b. x: -35.6 and y: -10.2 c. x: 3.13 and y: -17.7 d. x: -30.08 and y: 7.5

3. a. 190 km b. 134.5 km @48° west of north c. 107.6 km/hr @48° west of north d. 152 km/hr

4. 202 m/s at 8.5° east of north

5. 7.07 km at 45°

6. 6.63 km @ 75.8°

7. 87.3 km @ 43.1° north of west