

Homework 3: Vectors

Book Work: Chapter 3: 4, 6, 10, 18, 32, 64

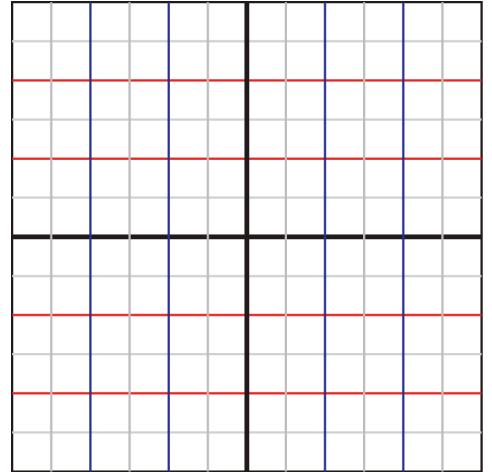
1. Sketch a position vector, r , for a guinea pig that has the components: $r_x=3$, $r_y=4$.

b. _____ Calculate the **magnitude** of her position vector.



c. _____ A different position vector described by $r_x=6$, $r_y=2$ is *subtracted* from the first vector. Calculate the x- and y-components of the resultant.

d. _____ Calculate the magnitude and angle of the resultant.



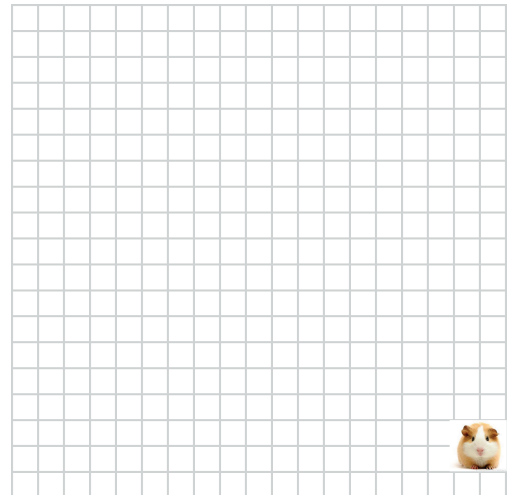
2. A guinea pig walks (waddles?) directly north for 15.0 m and stops. She then walks west for a distance of 8.0 m. Next she walks (directly) south-east for a distance of 11.0 m. Show a vector diagram (sketch) showing each successive displacement of the guinea pig.

b. _____ Calculate the magnitude of the displacement of the guinea pig.

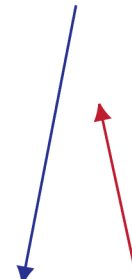
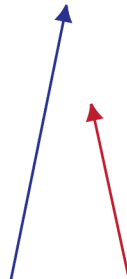
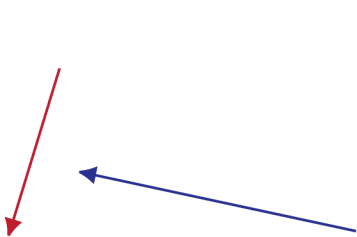
c. _____ If the entire trip for the guinea pig took 300 seconds, what was her average velocity?

d. How would the guinea pig's average speed compare to her average velocity? Explain.

e. _____ Calculate the magnitude and direction of the displacement vector what would return her to her original position.



3. Sketch, graphically, how each of these vectors add.

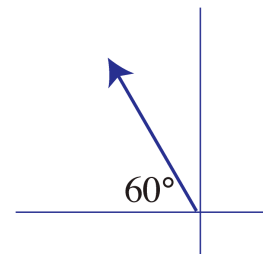


4. Sketch the sum of these vectors

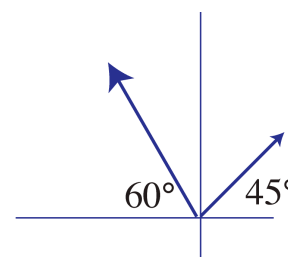


5. What is the largest and smallest magnitude of a resultant vector that can be obtained from a vector of magnitude 10 and one of magnitude 14? Sketch these two scenarios.

5. The vector shown has a magnitude of 10. Estimate its approximate x-component (without using a calculator)



b. _____ Estimate the approximate x-component of the *sum* of original vector and another vector of magnitude 8 directed at the indicated angle. (Do NOT use a calculator)



6. Draw two component vectors that are perpendicular to each other that would add to equal the provided vector.

