

Name \_\_\_\_\_ Date \_\_\_\_\_  
 Teacher \_\_\_\_\_ Period \_\_\_\_\_

### Vector Review W.S.

1. What is the difference between a vector and a scalar?

VECTOR → SIZE + DIRECTION, SCALAR → ONLY SIZE

2. What method is used to add vectors?

HEAD TO TAIL

3. List a few examples of vectors.

DISPLACEMENT, VELOCITY, ACCELERATION, FORCE

4. You can row a boat in still water a velocity of 12 m/s. If you row downstream (with the current) in a river that is flowing at a rate of 5 m/s, how long will it take you reach the end of the river 1500 m downstream?

$$v = 17 \text{ m/s} \quad D = 1500 \text{ m} \quad t = \frac{D}{v} = \frac{1500}{17} = 88.2 \text{ s}$$

5. Two vectors with magnitudes of 3 m and 4 m are added together. What is the maximum value that the resultant could be? What is the minimum possible value of the resultant?

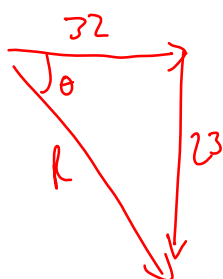
$$\text{MAX} = 7 \quad \text{MIN} = 1 \text{ m}$$

6. If a kite is 32m in the air and you unwound 105 m of string to get it there, what is the angle that the string makes with the ground? Assume no sag in the string.

$$\sin^{-1}\left(\frac{32}{105}\right) = 17.7^\circ$$



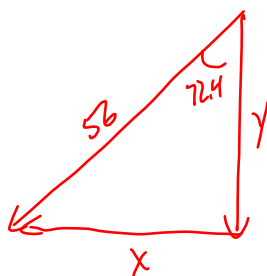
7. A vector has a horizontal component of the 32 m/s East and a vertical component of 23 m/s South. What is the magnitude and direction of the vector?



$$R^2 = 32^2 + 23^2 \\ = 39.4 \text{ m/s}$$

$$\theta = \tan^{-1}\left(\frac{23}{32}\right) \\ = 35.7^\circ \text{ SOUTH OF EAST}$$

8. What are the components of a vector with a magnitude of 56 m/s<sup>2</sup> and a direction of 72.4° West of South?



$$x = 56 \sin(72.4)$$

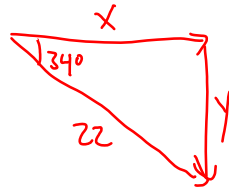
$$= 53.4 \text{ WEST}$$

$$y = 56 \cos(72.4)$$

$$= 16.9 \text{ SOUTH}$$

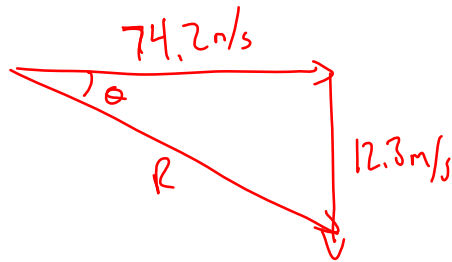
9. A plane travelling at a velocity of 56 m/s east encounters a wind blowing 22 m/s, 34° South of East. What is the resultant velocity of the plane?

56 m/s East →



$$x = 22 \cos 34^\circ = 18.2 \text{ m/s}$$

$$y = 22 \sin 34^\circ = 12.3 \text{ m/s}$$

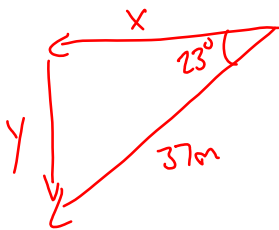


$$R = 75.2 \text{ m/s}$$

$$\theta = \tan^{-1} \left( \frac{12.3}{74.2} \right)$$

$$\theta = 9.41^\circ \text{ South of East}$$

4. A dog travels 37 m, 23° South of West. It then turns and travels 29 m, 41° East of South. What is the dog's displacement from its starting position?



$$x = 37 \cos 23^\circ = 34.06 \text{ West}$$

$$y = 37 \sin 23^\circ = 14.46 \text{ South}$$

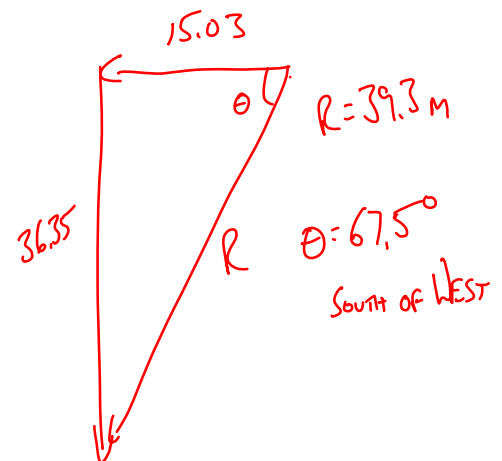


$$x = 29 \sin 41^\circ = 19.03 \text{ East}$$

$$y = 29 \cos 41^\circ = 21.89 \text{ South}$$

$$\sum x = 15.03 \text{ West}$$

$$\sum y = 36.35 \text{ South}$$



$$R = 39.3 \text{ m}$$

$$\theta = 67.5^\circ \text{ South of West}$$