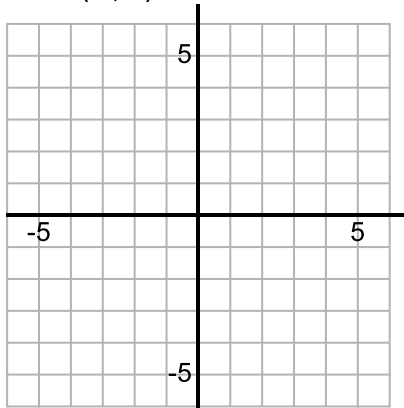


Given P(-3,4)
Q(-2,-3)



1. State the direction of this vector in all three forms if we are travelling from P to Q

$$\left[\quad \right] = \langle \quad, \quad \rangle = \text{---} \mathbf{i} + \text{---} \mathbf{j}$$

2. State the exact magnitude of this vector

3. State the unit vector related to this vector PQ

4. Determine the directional angle of this vector

The angle formed with the positive x axis and a vector drawn with same direction drawn from the origin is approximately _____°

Given $\vec{a} = \begin{bmatrix} -2 \\ 8 \end{bmatrix}$ and $\vec{b} = \begin{bmatrix} 6 \\ 10 \end{bmatrix}$

Perform the following vector operations

7. $|3a - 4b|$

5. $2a + 7b$

6. $\frac{-5}{4}a + \frac{7}{10}b$

Vector is said to parallel to another vector if it is a scalar multiple of another vector

$$\vec{c} = \begin{bmatrix} -20 \\ 30 \end{bmatrix} \text{ is parallel to } \vec{h} = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$$

8. Write a vector that is parallel to vector a-b that travels in the OPPOSITE direction, that is a third as long

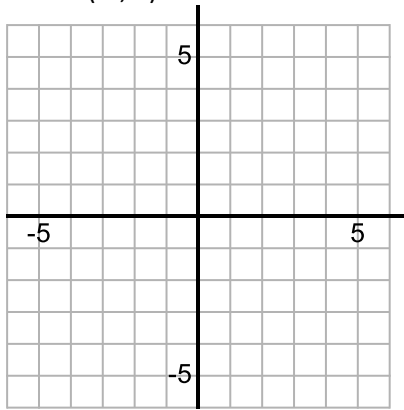
9. Write the unit vector related to $2a + 7b$

A resultant vector is the result of a set of operations on a vector

Let $\vec{d} = \frac{-5}{4}a + \frac{7}{10}b$

10. Write \vec{d} in unit vector form (hint: a vector in unit vector form does not have to have length 1, but a unit vector does!)

Given T(2,-5)
W(-4, 5)



11. State the direction of this vector in all three forms if we are travelling from T to W

$$\left[\quad \right] = \langle \quad, \quad \rangle = \text{---} \mathbf{i} + \text{---} \mathbf{j}$$

14. Determine the directional angle of this vector

12. State the exact magnitude of this vector

The angle formed with the positive x axis and a vector drawn with same direction drawn from the origin is approximately _____°

13. State the unit vector related to this vector TW

$$\cos(\theta) = \frac{a \cdot b}{|a||b|}$$

Given that $a = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$ $b = \langle -1, 3 \rangle$ and $c = -4\mathbf{i} - 1\mathbf{j}$

18. Find the smallest angle formed by the vectors a and b

15. Find the dot product between vectors a and b

16. Find the dot product between vectors a and c

19. Find the smallest angle formed by the vectors a and c

17. Find the dot product between vectors b and c

20. Find the smallest angle formed by the vectors b and c

21. Explain the difference between a directional angle and angle formed by two vectors
Be specific and use pictures to support your explanation

Parallel and Perpendicular Vectors

$$a = \begin{bmatrix} 2 \\ 3 \end{bmatrix} \quad b = \begin{bmatrix} 2 \\ -3 \end{bmatrix} \quad c = \begin{bmatrix} -2 \\ 3 \end{bmatrix} \quad d = \begin{bmatrix} -3 \\ 2 \end{bmatrix} \quad e = \begin{bmatrix} 0.2 \\ 0.3 \end{bmatrix} \quad f = \begin{bmatrix} -20 \\ -30 \end{bmatrix} \quad g = \begin{bmatrix} -0.5 \\ -0.75 \end{bmatrix}$$

22. How do you determine if a vector is parallel to another vector (many of you need to realize that COLLINEAR is ALSO PARALLEL)?

23. How do you determine if a vector perpendicular to another vector? Gee I wish there was a fast and easy check to see if two vectors are perpendicular.....man if only someone would come up with a rule for this

24. Referring to the direction vectors above answer the following questions

a. Which vectors are parallel (or collinear) to $a = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$?

b. Which vectors are perpendicular to $a = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$?

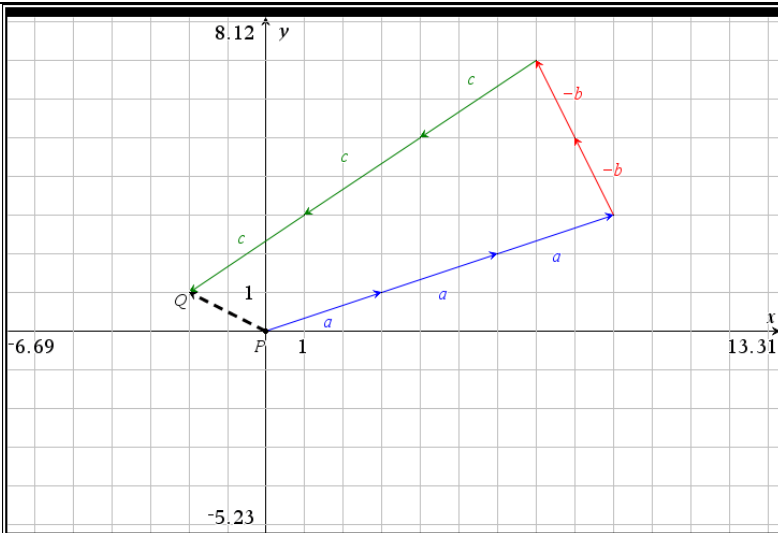
c. Which vectors travel in the opposite direction as $a = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$?

25. Find the value of each of the variables

a. $h = \begin{bmatrix} 5 \\ y \end{bmatrix}$ find y if the vector h is parallel (or collinear) to $a = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$

b. $m = \begin{bmatrix} w \\ 8 \end{bmatrix}$ find w if vector m is perpendicular to $a = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$

Vector Equations and Vector Polygons

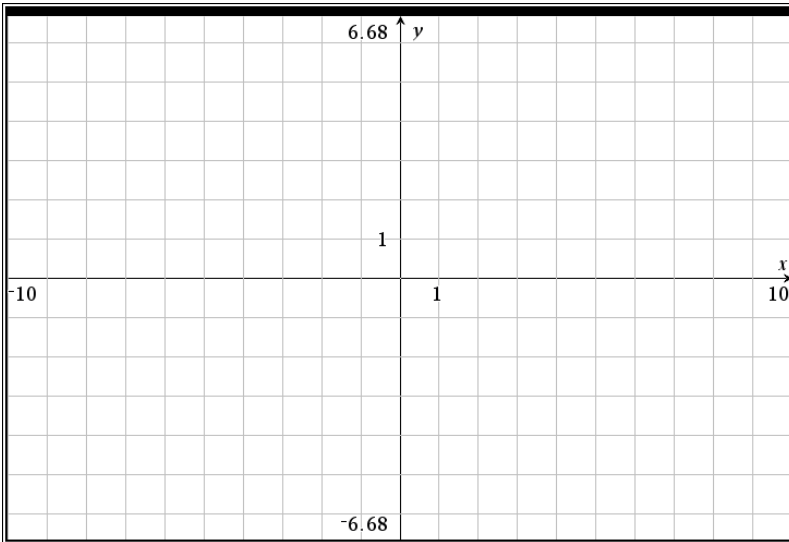


This is a vector polygon
It can be represented by a particular
vector equation

We can say that vector PQ is the vector
equation

26. Vector PQ =

(use lower case letters)



Given that

$$a = \begin{bmatrix} 2 \\ 3 \end{bmatrix} \quad b = \langle -1, 3 \rangle \quad \text{and} \quad c = -4i - 1j$$

27. Draw the vector polygon
 $-2a + 3b - 2c$

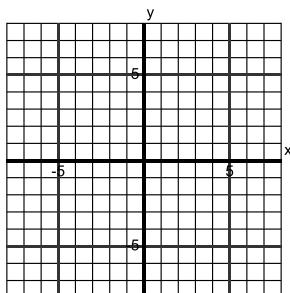
**DON'T FORGET TO CLOSE THE VECTOR
POLYGON**

If we call the resultant vector RW

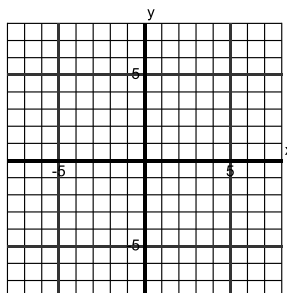
28. What is the direction vector
associated with RW?

Given that $a = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$ $b = \langle -1, 3 \rangle$ and $c = -4i - 1j$

29. Draw $d = a + b$



30. Draw $e = a - c$



31. Draw $f = -b - c$

