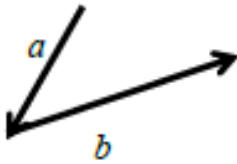


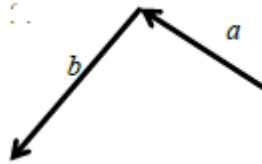
15.3 Operations on Vectors

Draw the resultant vector of $\vec{a} + \vec{b}$

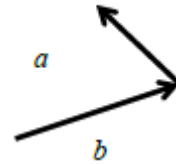
1.



2.

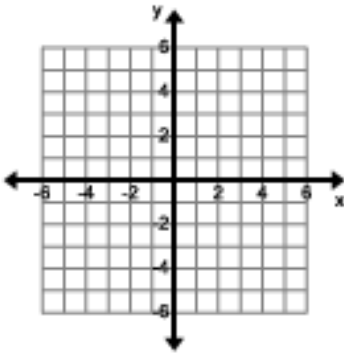


3.

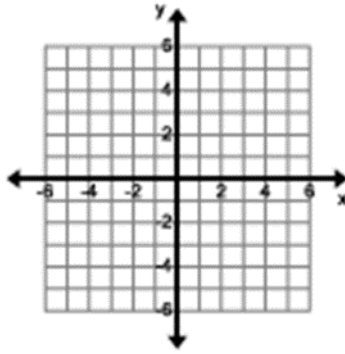


Given $v = \langle 3, 2 \rangle$, $s = \langle 2, -6 \rangle$, $t = \langle -5, 5 \rangle$, and $w = \langle 2, -4 \rangle$, find the sum of each of the following.

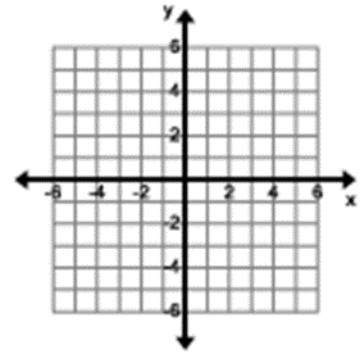
4. $\vec{w} + \vec{t}$



5. $\vec{v} + \vec{s}$



6. $\vec{s} + \vec{t}$



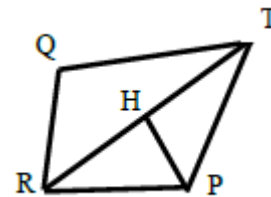
Given quadrilateral RPTQ, complete each statement.

7. $\overline{RP} + \overline{PT} =$

8. $\overline{PH} + \overline{HR} =$

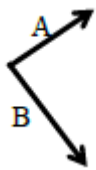
9. $\overline{TQ} + \overline{QR} =$

10. $\overline{RT} + \overline{TQ} =$

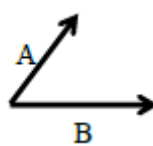


Draw the resultant vector of $\vec{a} - \vec{b}$

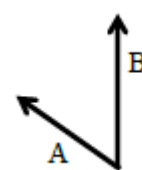
11.



12.

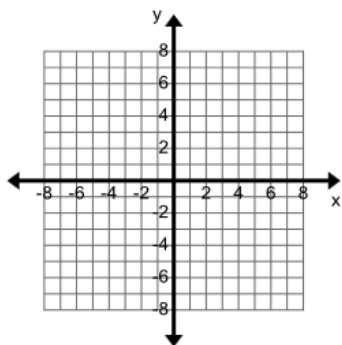


13.

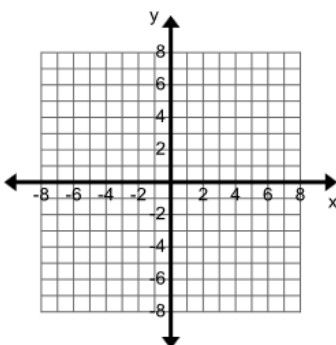


Given $v = \langle 3, 2 \rangle$, $s = \langle 2, -6 \rangle$, $t = \langle -5, 5 \rangle$, and $w = \langle 2, -4 \rangle$, find the difference of each of the following.

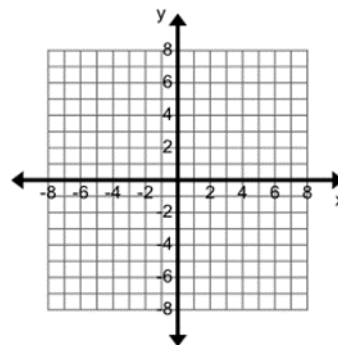
14. $\vec{v} - \vec{s}$



15. $\vec{t} - \vec{w}$



16. $\vec{v} - \vec{w}$



Find the magnitude of each vector.

17. $\vec{a} = \langle 2, 4 \rangle$

18. $\vec{b} = \langle 5, -3 \rangle$

19. $\vec{c} = \langle 0, 8 \rangle$

Find the magnitude of each sum.

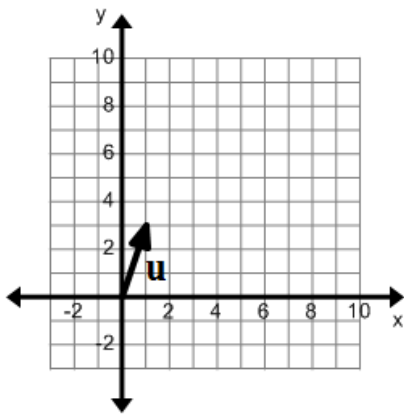
20. $\vec{a} + \vec{b}$ if $\vec{a} = \langle 2, 4 \rangle$ and $\vec{b} = \langle 5, -3 \rangle$

21. $\vec{a} + \vec{c}$ if $\vec{a} = \langle 2, 4 \rangle$ and $\vec{c} = \langle 0, 8 \rangle$

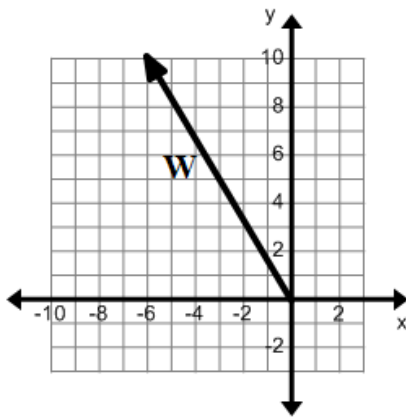
22. $\vec{b} + \vec{c}$ if $\vec{b} = \langle 5, -3 \rangle$ and $\vec{c} = \langle 0, 8 \rangle$

23. Finish the sentence: "The magnitude of the sum of two vectors is not equal to

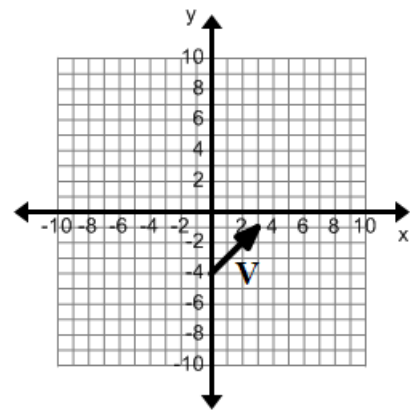
24. $3u$



25. $\frac{1}{2}w$



26. $-4v$



For problems 4-9, use $v = \langle -1, 6 \rangle$, $u = \langle 3, 4 \rangle$, and $w = \langle -2, 8 \rangle$. Find the new vector.

27. $4u$

28. $-10v$

29. $\frac{3}{2}w$

30. $-2v + 5u$

31. $\frac{1}{2}v + \frac{1}{4}w$

32. $-3u - 4w$

For problems 10-15, use $v = \langle 3, -2 \rangle$, $u = \langle 4, 1 \rangle$, and $w = \langle -3, 6 \rangle$. Find the magnitude of the new vector.

33. $4u$

34. $-3v$

35. $\frac{1}{3}w$

36. $3v - 4u$

37. $-5u + 12w$

38. $6v + 2w$

Compare the magnitude and direction for each.

39. $7v, -2v, v$

40. $\frac{1}{2}w, -5w, w$