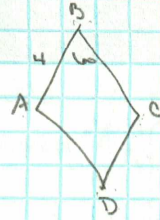


Setung 12.1 12.2



1.  $\vec{AD} = \vec{BC}$  (E)

2.  $|\vec{BC}| = 4$  (F)

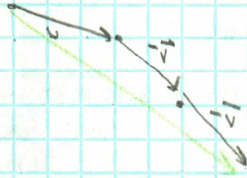
3.  $\vec{AD} + \vec{DC} = \vec{AC} = \vec{AD} + \vec{BC}$  (A)

4.  $\vec{BC} + \vec{CA} = \vec{BA} = -\vec{AB}$  (C)

5.  $|\vec{AC} + \vec{CD}| = 4\sqrt{3} = (D)$

law of Cosines  $x^2 = 4^2 + 4^2 - 2(4)(4)(\cos 120)$   
 $x^2 = 48$   
 $x = \sqrt{48} = 4\sqrt{3}$   
 $x = 4\sqrt{3}$

6.  $\vec{AD} + \vec{CD} = \vec{0}$  (D)



8. sketch

9.  $\vec{AB} = \langle 1-5, -5-1 \rangle = \langle -4, -6 \rangle$

$|\vec{AB}| = \sqrt{(-4)^2 + (-6)^2} = \sqrt{16+36} = \sqrt{52} = 2\sqrt{13}$

10.  $\vec{u} = \langle -3, -4 \rangle$   $\vec{v} = \langle 5, 2 \rangle$

a.  $\vec{u} - \vec{v} = \langle -3-5, -4-2 \rangle = \langle -8, -6 \rangle$

b.  $|\vec{u} - \vec{v}| = \sqrt{64+36} = 10$

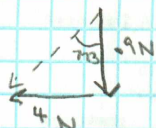
c.  $4\vec{u} + \frac{1}{2}\vec{v} = \langle -12, -16 \rangle + \langle \frac{5}{2}, 1 \rangle = \langle -9\frac{1}{2}, -15 \rangle$

e.  $\frac{|\vec{u}|}{|\vec{v}|} = \frac{\sqrt{(-3)^2 + (-4)^2}}{\sqrt{5^2 + 2^2}} = \frac{\sqrt{25}}{\sqrt{29}} = \frac{5}{\sqrt{29}}$

11.  $|\vec{v}|$  is a number - it has no direction

$|\vec{v}|$  is a non-negative real #, represents length.

12.



$$\sqrt{9^2 + 4^2} = |\vec{v}|$$

$$\tan^{-1} \frac{4}{9} = \theta$$

$$\sqrt{16.81} = |\vec{v}|$$

$$\theta = 27.3^\circ$$

$$4.1 \text{ N} = |\vec{v}|$$

$$180 + 27.3 = \underline{\underline{207.3^\circ}}$$

13. Vector subtraction is not commutative - reverses direction

14. A (2, 0) B (10, -4)

$$\vec{AB} = (10-2, -4-0) = \langle 8, -4 \rangle$$

$$\vec{OA} + \frac{3}{4} \vec{AB}$$

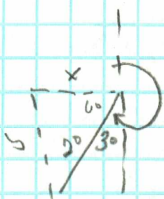
$$= \langle 2, 0 \rangle + \frac{3}{4} \langle 8, -4 \rangle$$

$$= \langle 2, 0 \rangle + \langle 6, -3 \rangle$$

$$= \langle 8, -3 \rangle$$

or horizontal distance 8  
vertical distance -4

15.



$$E-W \quad \cos 60 = \frac{x}{20}$$

$$10 \text{ knots west}$$

$$N-S \quad \sin 60 = \frac{y}{20}$$

$$10\sqrt{3} \text{ knots South} \\ (17.3 \text{ knots})$$