5. The magnitude of the vector sum need not be larger than the magnitude of either contributing vector. For example, if the two vectors being added are the exact opposite of each other, the vector sum will have a magnitude of 0. The magnitude of the sum is determined by the angle between the two contributing vectors.

Problems
4. Given that $V_x = 6.80$ units and $V_y = -7.40$ units, the magnitude of $\vec{V}$ is given by $V = \sqrt{V_x^2 + V_y^2} = \sqrt{6.80^2 + (-7.40)^2} = 10.0$ units. The direction is given by an angle of $\theta = \tan^{-1} \left( \frac{-7.40}{6.80} \right) = -47^\circ$, or $47^\circ$ below the positive $x$-axis.
6. The sum is found by adding the components of vectors $\vec{V}_1$ and $\vec{V}_2$

$$\vec{V} = \vec{V}_1 + \vec{V}_2 = (8.0, -3.7, 0.0) + (3.9, -8.1, -4.4) = (11.9, -11.8, -4.4)$$

$$V = |\vec{V}| = \sqrt{(11.9)^2 + (11.8)^2 + (-4.4)^2} = 17.3$$

9. (a) $v_{north} = (735 \text{ km/h})(\cos 41.5^\circ) = 550 \text{ km/h}$  
$v_{west} = (735 \text{ km/h})(\sin 41.5^\circ) = 487 \text{ km/h}$

(b) $\Delta d_{north} = v_{north}t = (550 \text{ km/h})(3.00 \text{ h}) = 1650 \text{ km}$

$\Delta d_{west} = v_{west}t = (487 \text{ km/h})(3.00 \text{ h}) = 1460 \text{ km}$

11. $A_x = 44.0 \cos 28.0^\circ = 38.85$  
   $A_y = 44.0 \sin 28.0^\circ = 20.66$

   $C_x = 31.0 \cos 270^\circ = 0.0$  
   $C_y = 31.0 \sin 270^\circ = -31.00$

   $\left(\vec{A} - \vec{C}\right)_x = 38.85 - 0.0 = 38.85$  
   $\left(\vec{A} - \vec{C}\right)_y = 20.66 - (-31.0) = 51.66$

   $|\vec{A} - \vec{C}| = \sqrt{(38.85)^2 + (51.66)^2} = 64.6$  
   $\theta = \tan^{-1}\frac{51.66}{38.85} = 53.1^\circ$

16. $70.0 = \sqrt{x^2 + (-55.0)^2} \rightarrow 4900 = x^2 + 3025 \rightarrow x^2 = 1875 \rightarrow x = \pm 43.3 \text{ units}$