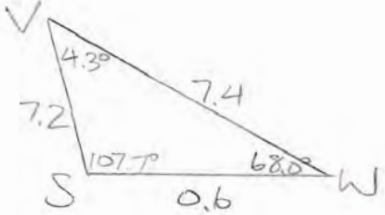
[2][a]



SSA $2\frac{1}{2}$ S OBTUSE, $S > W \rightarrow 1\ \Delta$

$$\frac{\sin W}{7.2} = \frac{\sin 107.7°}{7.4} \quad 2\frac{1}{2}$$

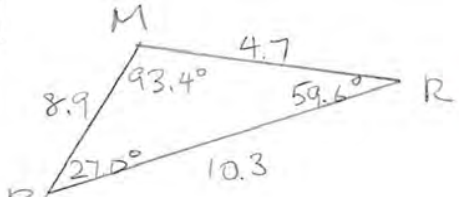
$$W = \sin^{-1}\frac{7.2\sin 107.7°}{7.4} \approx 67.9857° \quad 1\frac{1}{2}$$

$$V = 180° - 107.7° - 67.9857° = 4.3413° \quad 1\frac{1}{2}$$

$$\frac{V}{\sin 4.3413°} = \frac{7.4}{\sin 107.7°} \quad 2\frac{1}{2}$$

$$V = \frac{7.4\sin 4.3413°}{\sin 107.7°} \approx 0.6 \quad 1\frac{1}{2}$$

[b]



$4\frac{1}{2}$ $p^2 = 8.9^2 + 10.3^2 - 2(8.9)(10.3)\cos 27.0°$

$p \approx 4.6843$ $1\frac{1}{2}$

$2\frac{1}{2}$ $\frac{\sin R}{8.9} = \frac{\sin 27.0°}{4.6843}$

$R = \sin^{-1}\frac{8.9\sin 27.0°}{4.6843} \approx 59.6059°$ $1\frac{1}{2}$

$M = 180° - 27° - 59.6059° = 93.3941°$ $1\frac{1}{2}$

[3] [a] $\overrightarrow{AC} = \langle -3 - -5, 4 - -2 \rangle = \langle 2, 6 \rangle$ 1½

$\overrightarrow{BD} = \langle k - 4 - -1, -k - 5 \rangle = \langle k + 7, -k - 5 \rangle$ 1½

$\overrightarrow{AC} \cdot \overrightarrow{BD} = 2(k+7) + 6(-k-5) < 0$ 2½

$-4k - 16 < 0$

$-4k < 16$

$k > -4$ 2½

[b] $\vec{v} = \langle -5-11, -2-5 \rangle = \langle 6, -7 \rangle = 6\vec{i} - 7\vec{j}$ 1½

[c] $-6\overrightarrow{AC} - 3\vec{v} - 12\vec{v} + 4\vec{x} = 8\vec{x} - 6\overrightarrow{AC}$ (1½, 1½, 1½)

$-4\vec{x} = 15\vec{v}$

$\vec{x} = -\frac{15}{4}\vec{v} = -\frac{15}{4}\langle 6, -7\rangle = \left\langle -\frac{45}{2}, \frac{105}{4} \right\rangle$ (1½, 1½)

[d] $\theta = \cos^{-1} \frac{\langle 6,-7\rangle \cdot \langle 2,6\rangle}{\|\langle 6,-7\rangle\| \|\langle 2,6\rangle\|} = \cos^{-1} \frac{12-42}{\sqrt{36+49}\sqrt{4+36}} = \cos^{-1} \frac{-30}{\sqrt{85}\sqrt{40}}$ 1½ 2½ 2½

$\approx 121.0^\circ$ 1½

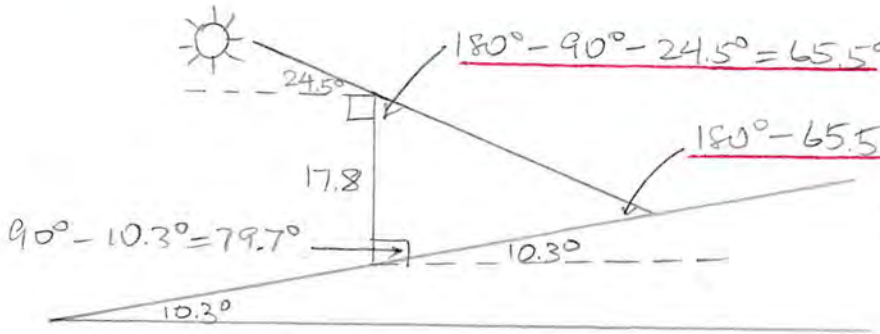
[e] $\text{PROJ}_{\overrightarrow{AC}}\vec{U} = \dfrac{\langle 6,-7\rangle \cdot \langle 2,6\rangle}{\langle 2,6\rangle \cdot \langle 2,6\rangle}\langle 2,6\rangle = \dfrac{2\frac{1}{2}-30}{2\frac{1}{2}-40}\langle 2,6\rangle = \langle -\frac{3}{2}, -\frac{9}{2}\rangle$ ($1\frac{1}{2}$)

($2\frac{1}{2}$)

$2\frac{1}{2}\langle 6,-7\rangle - \langle -\frac{3}{2}, -\frac{9}{2}\rangle = \langle \frac{15}{2}, -\frac{5}{2}\rangle$

$1\frac{1}{2}\langle 6,-7\rangle = \langle -\frac{3}{2}, -\frac{9}{2}\rangle + \langle \frac{15}{2}, -\frac{5}{2}\rangle$

[4]



$180° - 90° - 24.5° = 65.5°$ 2½

$180° - 65.5° - 79.7° = 34.8°$ 2½

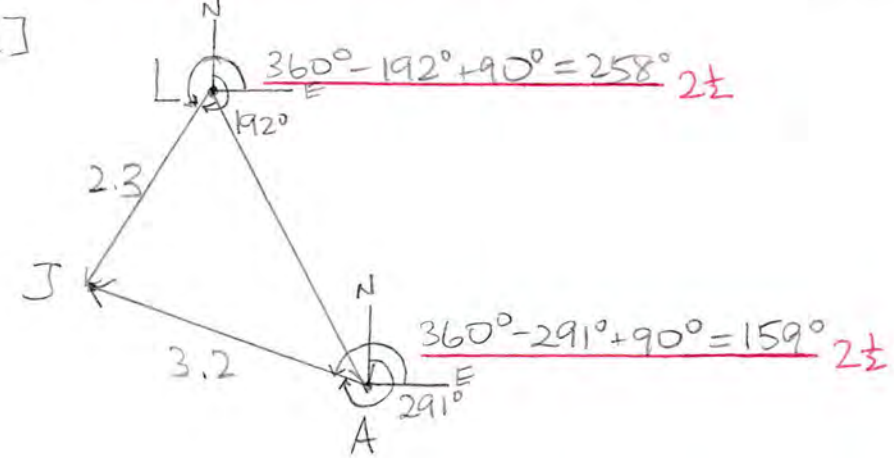
OR

$24.5° + 10.3° = 34.8°$

$$\frac{S}{\sin 65.5°} = \frac{17.8}{\sin 34.8°} \rightarrow S = \frac{17.8 \sin 65.5°}{\sin 34.8°} \approx 28.4 \text{ FT}$$

2½ 1½

[5] [a]



$360° - 192° + 90° = 258°$ 2½

$360° - 291° + 90° = 159°$ 2½

[i] $\overrightarrow{AJ} = \langle 3.2\cos 159°, 3.2\sin 159° \rangle$ 2½

[ii] $\overrightarrow{LJ} = \langle 2.3\cos 258°, 2.3\sin 258° \rangle$ 2½

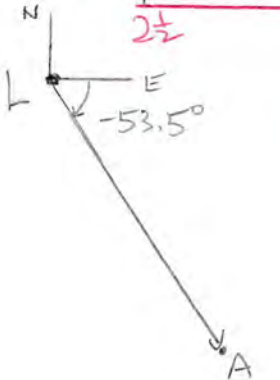
[iii] $\overrightarrow{LA} = \overrightarrow{LJ} + \overrightarrow{JA} = \overrightarrow{LJ} - \overrightarrow{AJ}$

$= \langle 2.3\cos 258° - 3.2\cos 159°, 2.3\sin 258° - 3.2\sin 159° \rangle$ 2½

[b] $\overrightarrow{LA} \approx \langle 2.5093, -3.3965 \rangle$ 1½

$\|\overrightarrow{LA}\| = \sqrt{2.5093^2 + (-3.3965)^2} \approx 4.2$ MILES

2½ 1½



$\tan^{-1}\frac{-3.3965}{2.5093} \approx -53.5°$

2½ 1½

BEARING = $90° + 53.5° = 143.5°$

2½