7.3 HW Solutions

21.) $a = 3$, $c = 2$, $\beta = 110^\circ$

$\alpha = \underline{42.86^\circ}$, $\gamma = \underline{27.14^\circ}$, $b = \underline{4.14}$

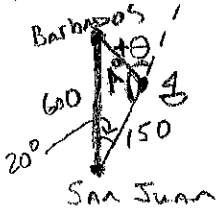
• SAS, so Law of Cosines

① $b = \sqrt{a^2 + c^2 - 2ac\cos\beta} = \sqrt{(3)^2 + (2)^2 - 2(3)(2)\cos 110^\circ} = \underline{4.14}$

② $\alpha = \cos^{-1}\left[\dfrac{b^2 + c^2 - a^2}{2bc}\right] = \cos^{-1}\left[\dfrac{(4.14)^2 + (2)^2 - (3)^2}{2(4.14)(2)}\right] = \underline{42.86^\circ}$

③ $\gamma = 180 - (110 + 42.86) = \underline{27.14^\circ}$

35.) 1 Knot = 1 Nautical mi/hr



• SAS, so Law of Cosines

① Find $x \rightarrow x = \sqrt{(600)^2 + (150)^2 - 2(600)(150)\cos 20^\circ} = \underline{461.9\text{ mi}}$

② Use x to find $\angle A$, then use A to find θ (the angle the captain should turn to head directly to Barbados.

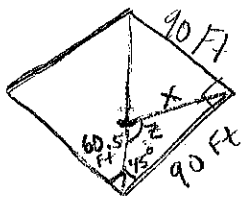
$$A = \cos^{-1}\left[\frac{(461.9)^2 + (150)^2 - (600)^2}{2(461.9)(150)}\right] = \underline{153.63^\circ}$$

a.) $\theta = 180 - A = 180 - 153.63 = \boxed{26.37^\circ}$

b.) $\dfrac{\text{Distance}}{\text{rate}} = \text{time}$

$$\frac{461.9}{15} = \boxed{30.8\text{ hrs}}$$

37.)



a.) $X = \sqrt{(60.5)^2 + (90)^2 - 2(60.5)(90)\cos 45^\circ}$

$\boxed{X = 63.7 \text{ Ft}}$ → Distance from the pitching mound to 1st base

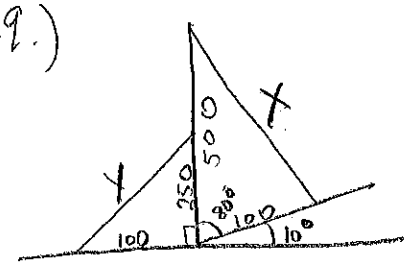
b.) Dist from home plate to 2ND base is $\sqrt{(90)^2 + (90)^2} = 127.3$ Ft

• $127.3 - 60.5 = \boxed{66.8 \text{ Ft}}$ Distance from 2ND base to the mound

c.) $Z = \cos^{-1}\left[\frac{(60.5)^2 + (63.7)^2 - (90)^2}{2(60.5)(63.7)}\right]$

$\boxed{Z = 92.8^\circ}$ Angle the pitcher needs to turn to face 1st base

39.)



a.) $X = \sqrt{(100)^2 + (500)^2 - 2(100)(500)\cos 80^\circ}$

$\boxed{X = 492.6 \text{ Ft}}$

b.) $y = \sqrt{(100)^2 + (250)^2} = \boxed{269.3 \text{ Ft}}$