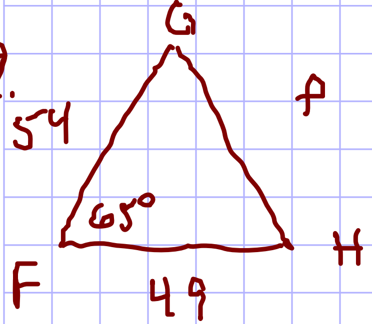
10.6 # 9-24 m3, 25-33 odd

9.



SAS → L.O.C.

$F = \underline{65°}$ $f = \underline{55.502}$

$G = \underline{53.1°}$ $g = \underline{49}$

$H = \underline{61.9°}$ $h = \underline{54}$

$f^2 = (49)^2 + (54)^2 - 2(54)(49)\cos 65°$

$f^2 = 3080.504159\ldots$

$f = 55.502$

$\frac{\sin H}{54} = \frac{\sin 65°}{55.502}$

$\sin H = \frac{54 \sin 65°}{55.502}$

$H = \sin^{-1}\left(\frac{54 \sin 65°}{55.502}\right)$

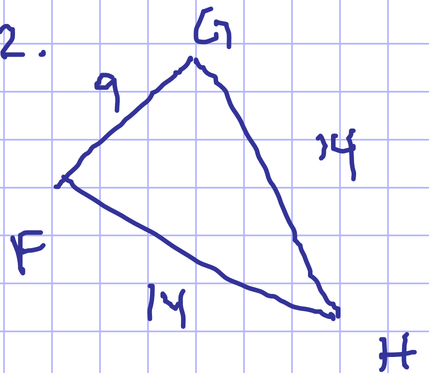
$H = 61.9°$

$G = 180° - (F + H)$

$G = 180° - (65° + 61.9°)$

$G = 53.1°$

12.



$F = \underline{71.3°}$ $f = \underline{14}$

$G = \underline{71.3°}$ $g = \underline{14}$

$H = \underline{37.4°}$ $h = \underline{9}$

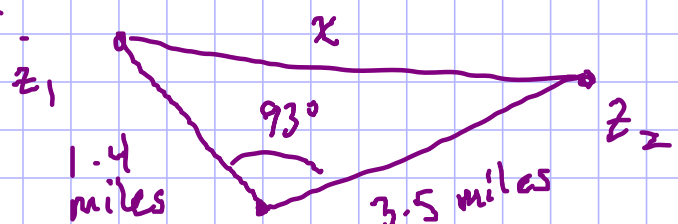
$$\cos F = \frac{g^2+h^2-f^2}{2gh} = \frac{\cancel{(14)^2}+(9)^2-\cancel{(14)^2}}{2(9)(14)} = \frac{81}{252}$$

$$F = \cos^{-1}\left(\frac{81}{252}\right) = 71.3^\circ$$

$$g = f \therefore G = F$$

$$H = 180^\circ - (F+G) = 180^\circ - (71.3^\circ + 71.3^\circ) = 37.4^\circ$$

15.

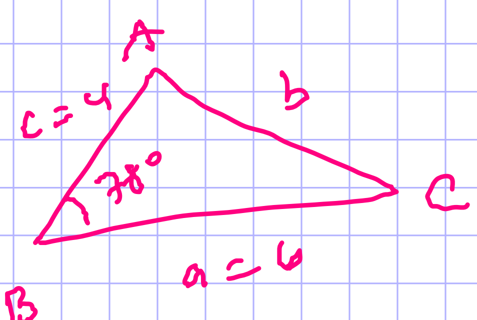


$$x^2 = (1.4)^2 + (3.5)^2 - 2(1.4)(3.5)\cos 93^\circ$$

$$x^2 = 14.72284\ldots$$

$$\boxed{x = 3.8 \text{ miles}}$$

18.



$A = \underline{64.5^\circ}$ $a = \underline{6}$ ✓

$B = \underline{78^\circ}$ $b = \underline{6.5}$ ✓

$C = \underline{37.5^\circ}$ $c = \underline{4}$ ✓

$$b^2 = (6)^2 + (4)^2 - 2(6)(4)\cos 78^\circ$$

$b^2 = 42.02023...$

$b = 6.5$

$$\frac{\sin A}{6} = \frac{\sin 78^\circ}{6.5}$$

$$C = 180^\circ - (A+B)$$

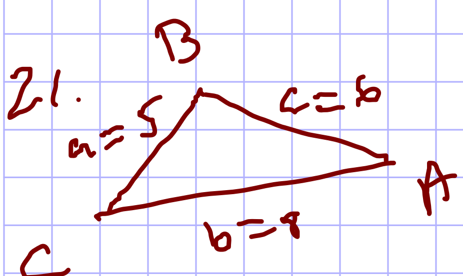
$$C = 180^\circ - (64.5^\circ + 78^\circ)$$

$$\sin A = \frac{6 \sin 78^\circ}{6.5}$$

$$C = 37.5^\circ$$

$$A = \sin^{-1}\left(\frac{6 \sin 78^\circ}{6.5}\right) = 64.5^\circ$$

21.



$A = \underline{38.6^\circ}$ $a = \underline{5}$ ✓

$B = \underline{92.9^\circ}$ $b = \underline{8}$ ✓

$C = \underline{48.5^\circ}$ $c = \underline{6}$ ✓

$$\cos B = \frac{(5)^2 + (6)^2 - (8)^2}{2(5)(6)}$$

$$A = 180^\circ - (B+C)$$

$$B = \cos^{-1}\left(\frac{-3}{60}\right) = 92.9^\circ$$

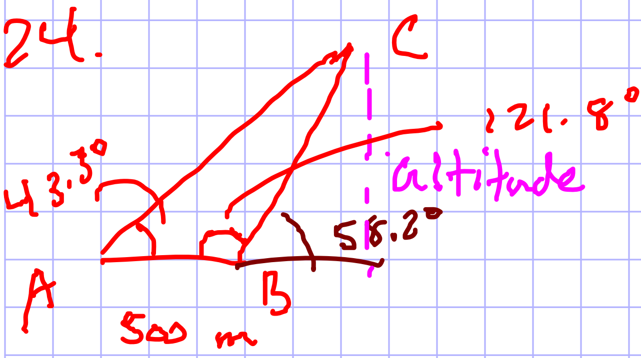
$$A = 180^\circ - (92.9^\circ + 48.5^\circ)$$

$$A = 38.6^\circ$$

$$\frac{\sin C}{6} = \frac{\sin 92.9^\circ}{8}$$

$$C = \sin^{-1}\left(\frac{6 \sin 92.9^\circ}{8}\right) = 48.5^\circ$$

24.



$$\sin 58.2° = \frac{alt}{1333.588}$$

$$1333.588 \sin 58.2 = alt$$

$$\boxed{\text{altitude} = 1133 \text{ meters}}$$

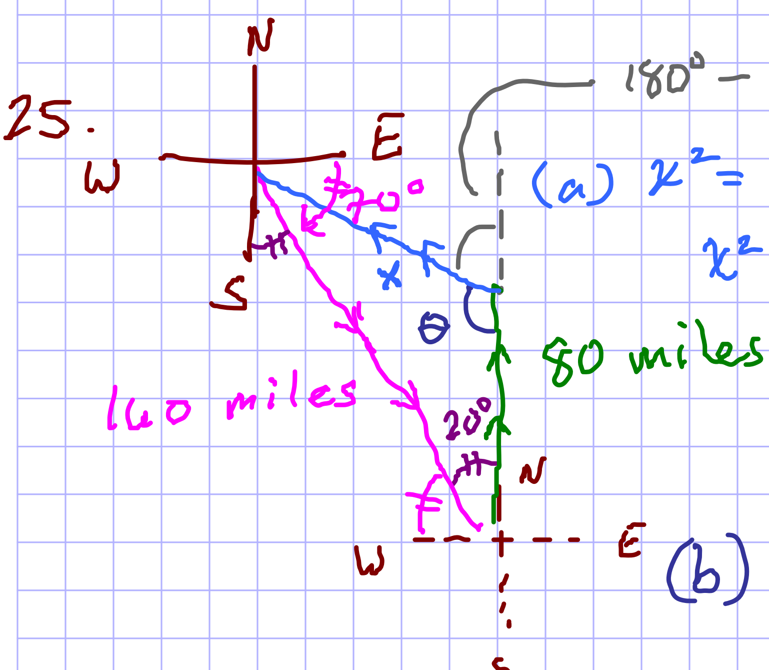
$$B = 180° - 58.2° = 121.8°$$

$$C = 180° - (A+B) = 180° - (43.3° + 121.8°) = 14.9°$$

$$\frac{a}{\sin 43.3°} = \frac{500}{\sin 14.9°}$$

$$a = \frac{500 \sin 43.3°}{\sin 14.9°} = 1333.588 \text{ m}$$

25.



$$180° - 142° = 38°$$

(a) $x^2 = (160)^2 + (80)^2 - 2(160)(80)\cos 20°$

$$x^2 = 7943.868908\ldots$$

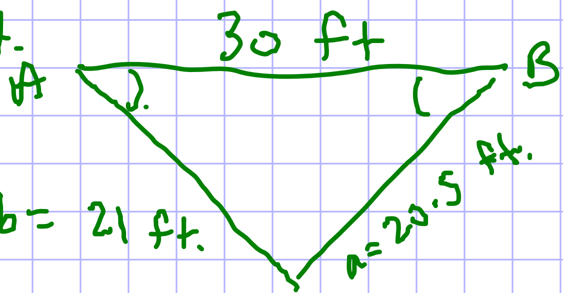
$$\boxed{x = 89 \text{ miles}}$$

(b) $\cos\theta = \dfrac{(80)^2 + (89)^2 - (160)^2}{2(80)(89)}$

$$\theta = \cos^{-1}\left(\frac{-11279}{14240}\right) = 142°$$

In the third stage, the pilot needs to turn the plane 38° west of North.

27.



(a) $\cos A = \dfrac{(30)^2+(21)^2-(20.5)^2}{2(30)(21)}$

$A = \cos^{-1}\left(\dfrac{920.75}{1260}\right)$

$\boxed{A = 43^\circ}$

$\dfrac{\sin B}{21} = \dfrac{\sin 43^\circ}{20.5}$

$B = \sin^{-1}\left(\dfrac{21 \sin 43^\circ}{20.5}\right)$

$\boxed{B = 44^\circ}$

(b) $a = 15$ ft

$b = 21$ ft

$\cos A = \dfrac{(30)^2+(21)^2-(15)^2}{2(30)(21)}$

$A = \cos^{-1}\left(\dfrac{1116}{1260}\right)$

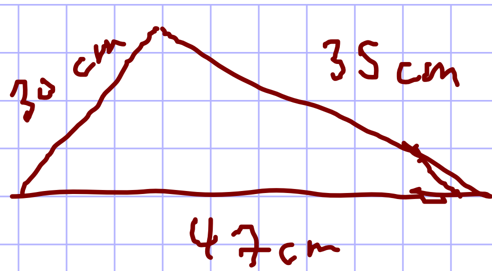
$\boxed{A = 28^\circ}$

$\dfrac{\sin B}{21} = \dfrac{\sin 28^\circ}{15}$

$B = \sin^{-1}\left(\dfrac{21 \sin 28^\circ}{15}\right)$

$\boxed{B = 41^\circ}$

29.



area (SSS) $\rightarrow$ Heron's formula

$$s = \frac{a+b+c}{2}$$

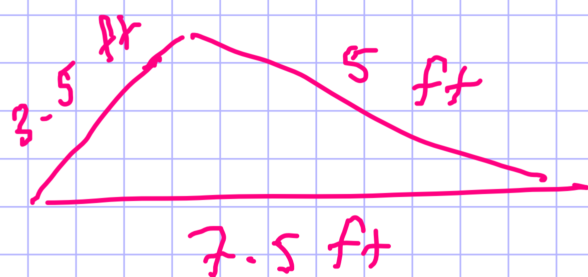
$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$S = \frac{30+35+47}{2} = 56$$

$$\text{area} = \sqrt{56(56-47)(56-35)(56-30)}$$

$$\boxed{\text{area} = 524.6 \text{ cm}^2}$$

31.



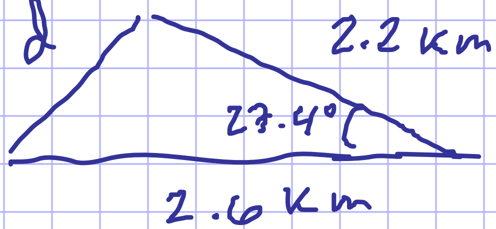
$$S = \frac{3.5+5+7.5}{2}$$

$$s = 8$$

$$\text{area} = \sqrt{8(8-3.5)(8-5)(8-7.5)}$$

$$\boxed{\text{area} = 7.3 \text{ ft}^2}$$

33.



$$d^2 = (2.6)^2 + (2.2)^2 - 2(2.6)(2.2)\cos 27.4^\circ$$

$$d^2 = 1.44339\ldots$$

$$\boxed{d = 1.2 \text{ km}}$$