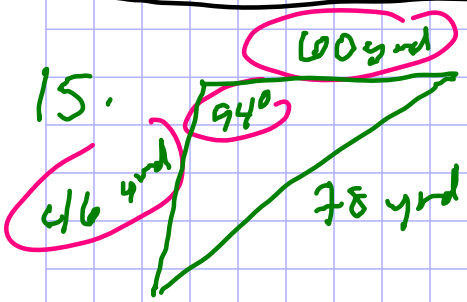
10.5 # 15-30 m3, 32, 34, 38

15.

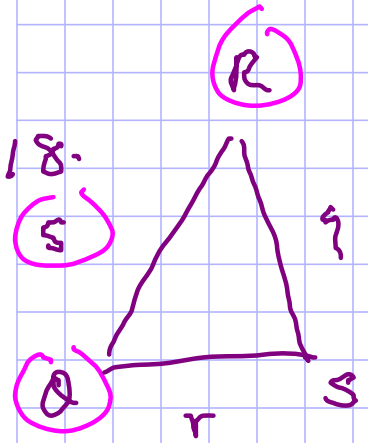


SAS

$\text{area} = \frac{1}{2}(46)(60)\sin 94°$

$\text{area} = 1376.6 \text{ yrds}^2$

18.



$R = 46°$ $\quad r = 10.5$ ✓

$Q = 50°$ $\quad q = 11.1$ ✓

$S = 84°$ $\quad s = 14.5$ ✓

AsA → L.O.S.

$S = 180° - (R+Q)$

$S = 180° - (46+50)$

$S = 84°$

$\frac{r}{\sin 46°} = \frac{14.5}{\sin 84°}$

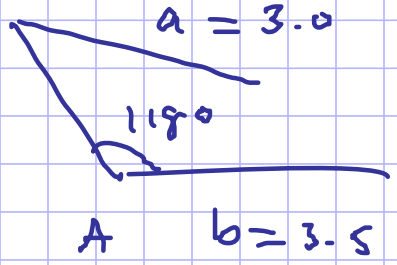
$r = \frac{14.5 \sin 46°}{\sin 84°}$

$r = 10.5$

$\frac{q}{\sin 50°} = \frac{14.5}{\sin 84°}$

$q = \frac{14.5 \sin 50°}{\sin 84°} = 11.1$

21.

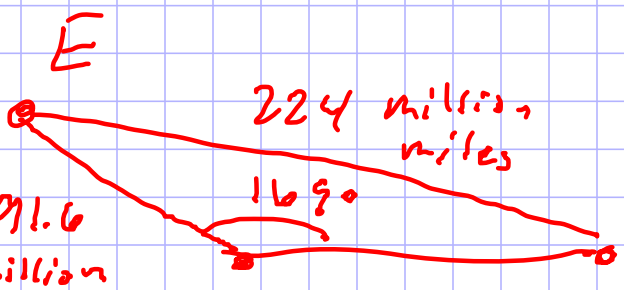


SSA → L.O.S.

(obtuse)

since $a < b$ ∴ no triangle possible

24.



SSA → L.O.S.

(obtuse)

$a > b$ ∴ 1 triangle

$$\frac{\sin M}{91.6} = \frac{\sin 169°}{224}$$

$$\sin M = \frac{91.6 \sin 169°}{224}$$

$$M = \sin^{-1}\left(\frac{91.6 \sin 169°}{224}\right)$$

$M = 4.475°$

$E = 180° - (S + m)$

$E = 180° - (169 + 4.475)$

$E = 6.525°$

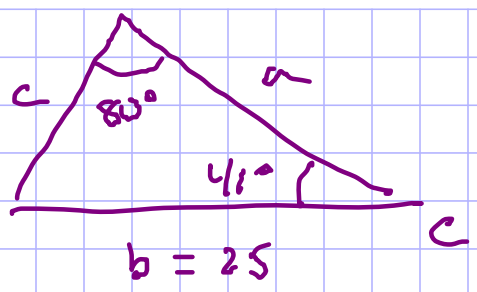
$$\frac{e}{\sin 6.525°} = \frac{224}{\sin 169°}$$

$$e = \frac{224 \sin 6.525°}{\sin 169°} = 133.4$$

The distance between the sun and Mars that day was 133 million miles.

AAS → L.O.S.

27.



$A = 59°$ $a = 21.8$ ✓

$B = 80°$ $b = 25$ ✓

$C = 41°$ $c = 16.7$ ✓

$A = 180° - (B + C)$

$A = 180° - (80° + 41°)$

$A = 59°$

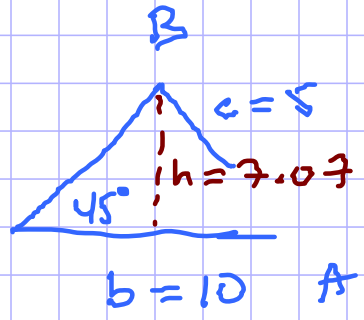
$\frac{a}{\sin 59°} = \frac{25}{\sin 80°}$

$a = \frac{25 \sin 59°}{\sin 80°} = 21.8$

$\frac{c}{\sin 41°} = \frac{25}{\sin 80°}$

$c = \frac{25 \sin 41°}{\sin 80°} = 16.7$

30.



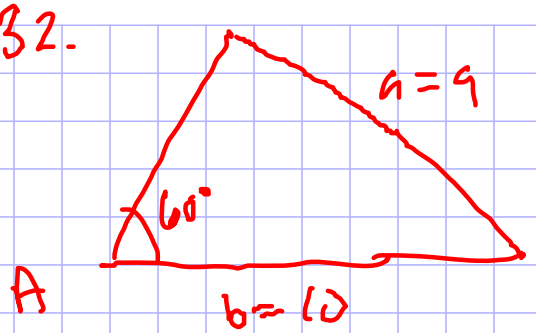
SSA → L.O.S.

(acute)

$h = b \sin C = 10 \sin 45° = 7.07$

$c < h$ ∴ no triangle possible

32.



SSA → L.O.S.

(acute)

$h = b \sin A = 10 \sin 60° = 8.66$

$h < a < b$ ∴ 2 △'s possible

Case 1

A = 60° a = 9 ✓

B = 74.2° b = 10 ✓

C = 45.8° c = 7.5 ✓

$$\frac{\sin B}{10} = \frac{\sin 60°}{9}$$

$$\sin B = \frac{10 \sin 60°}{9}$$

$$B = \sin^{-1}\left(\frac{10 \sin 60°}{9}\right)$$

$$B = 74.2°$$

$$C = 180° - (A+B)$$

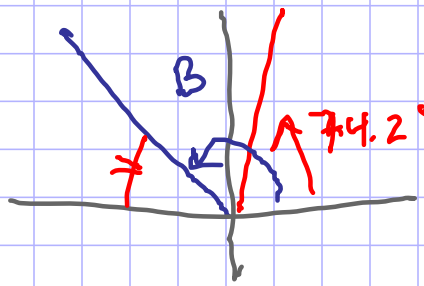
$$= 180° - (60° + 74.2°)$$

Case 2

A = 60° a = 9 ✓

B = 105.8° b = 10 ✓

C = 14.2° c = 2.5 ✓



$$B = 180° - 74.2° = 105.8°$$

$$C = 180° - (A+B)$$

$$C = 180° - (60° + 105.8°)$$

$$C = 14.2°$$

$C = 45.8°$

$$\frac{c}{\sin 45.8°} = \frac{9}{\sin 60°}$$

$$c = \frac{9 \sin 45.8°}{\sin 60°}$$

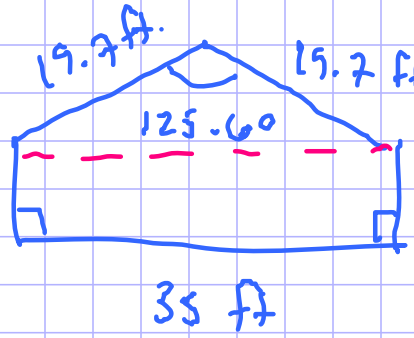
$$c = 7.5$$

$$\frac{c}{\sin 14.2} = \frac{9}{\sin 60°}$$

$$c = \frac{9 \sin 14.2°}{\sin 60°}$$

$$c = 2.5$$

34.



SAS

$$\text{area}_{\triangle} = \frac{1}{2}(19.7)(19.7)\sin 125.6$$

$$= 157.778$$

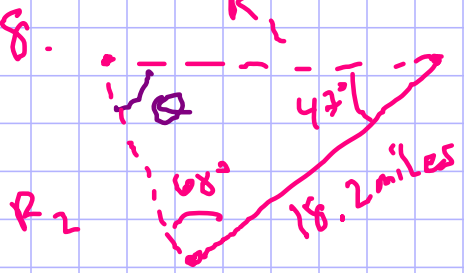
$$\text{area}_{\text{house}} = \text{area}_{\square} + \text{area}_{\triangle}$$

$$= 10(35) + 157.778$$

$$= 507.778$$

$$\text{area}_{\text{house}} \approx 508 \text{ ft}^2$$

38.



$$\theta = 180° - (68° + 47°)$$

$$\theta = 65°$$

$$\frac{R_1}{\sin 68^\circ} = \frac{18.2}{\sin 65^\circ}$$

$$R_1 = \frac{18.2 \sin 68^\circ}{\sin 65^\circ}$$

$$R_1 = 18.619 \text{ miles}$$

$$\frac{R_2}{\sin 47^\circ} = \frac{18.2}{\sin 65^\circ}$$

$$R_2 = \frac{18.2 \sin 47^\circ}{\sin 65^\circ}$$

$$R_2 = 14.687 \text{ miles}$$

Route 2 is 3.932 miles shorter than Route 1.