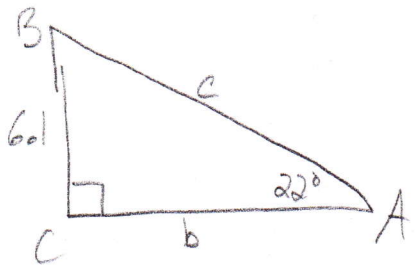
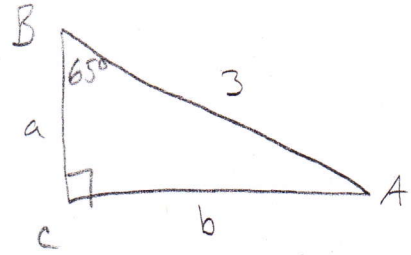
(1) 

$\tan 22° = \frac{6.1}{b}$ $\quad \sin 22° = \frac{6.1}{c}$

$b = \frac{6.1}{\tan 22°}$ $\quad c = \frac{6.1}{\sin 22°}$

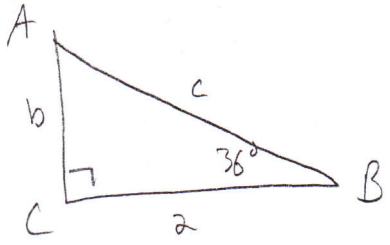
$b \approx 15.1$ $\quad c \approx 16.3$ $\quad B = 68°$

(2) 

$\sin 65° = \frac{b}{3}$ $\quad \cos 65° = \frac{a}{3}$

$b = 3 \cdot \sin 65°$ $\quad a = 3 \cdot \cos 65°$

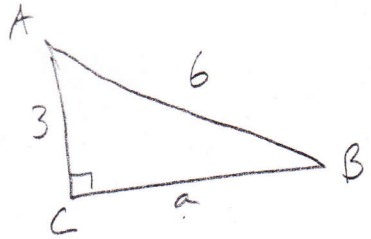
$b \approx 2.7$ $\quad a \approx 1.3$ $\quad A = 25°$

(3) 

$\tan 36° = \frac{b}{2}$ $\quad \cos 36° = \frac{2}{c}$

$b = 2 \cdot \tan 36°$ $\quad c = \frac{2}{\cos 36°}$

$b = 1.5$ $\quad c \approx 2.5$ $\quad A = 54°$

(4) 

$a^2 + 3^2 = 6^2$ $\quad \cos A = \frac{3}{6}$

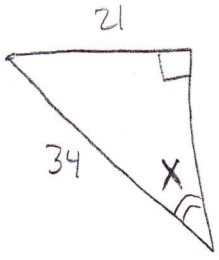
$a = \sqrt{36 - 9}$ $\quad A = \cos^{-1}\left(\frac{3}{6}\right)$

$a = \sqrt{27}$

$a = 3\sqrt{3}$

$a \approx 5.2$

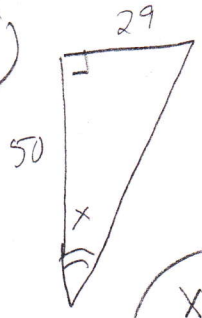
$A = 60°$ $\quad B = 30°$

(5) 

$\sin x = \frac{21}{34}$

$x = \sin^{-1}\left(\frac{21}{34}\right)$

$x \approx 38.1°$

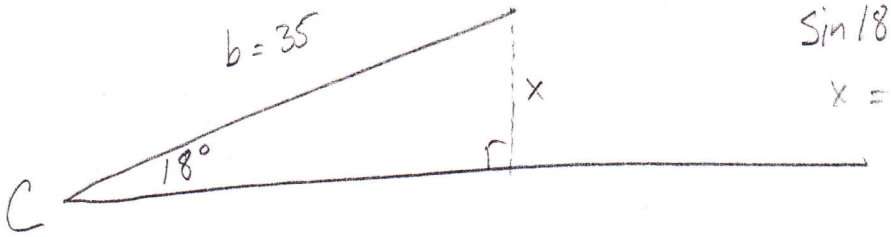
(6) 

$\tan x = \frac{29}{50}$

$x = \tan^{-1}\left(\frac{29}{50}\right)$

$x \approx 30.1°$

(7) SSA



$\sin 18° = \frac{x}{35}$

$x = 35(\sin 18°)$

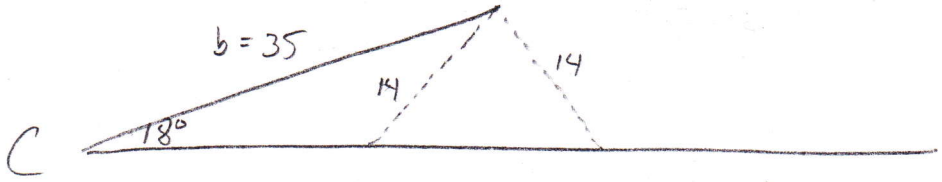
$x = 10.8156$

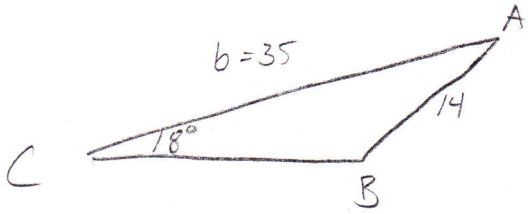
If $c < 10.8156$, then no Δ's

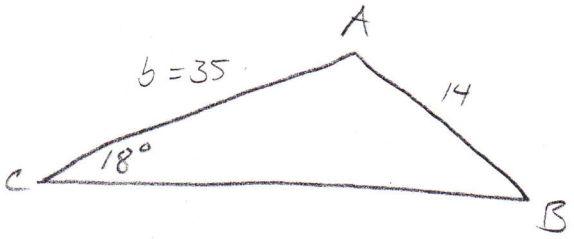
If $c = 10.8156$, then 1 Δ

If $10.8156 < c < 35$, then 2 Δ's ** $c = 14$ **

If $c \geq 35$, then 1 Δ.







$B = 180° - 50.58275409°$

$B \approx 129.4172459°$

$A \approx 32.58275409°$

$\frac{a}{\sin 32.58°} = \frac{14}{\sin 18°}$

$a = \frac{14 \cdot \sin 32.58°}{\sin 18°}$

$a \approx 24.4$ km

$A = 32.6°$

$B = 129.4°$

OR

$\frac{\sin B}{35} = \frac{\sin 18°}{14}$

$B = \sin^{-1}\left(\frac{35 \cdot \sin 18°}{14}\right)$

$B \approx 50.58275409°$

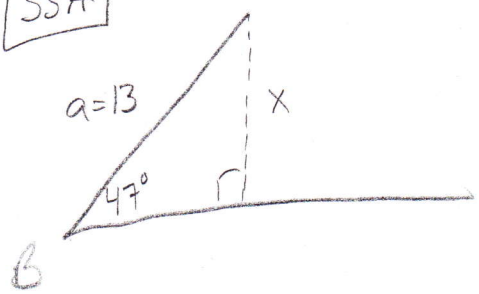
$A \approx 111.4172459°$

$\frac{a}{\sin 111.42°} = \frac{14}{\sin 18°}$

$a = \frac{14 \cdot \sin 111.42°}{\sin 18°} \approx 42.2$

$a \approx 42.2$ km $A \approx 111.4°$ $B \approx 50.6°$

(8) SSA



$\sin 47° = \frac{x}{13}$

$x = 13 \cdot \sin 47°$

$x = 9.5076$

** b = 4 **

If $b < 9.5076$, then no $\triangle$'s

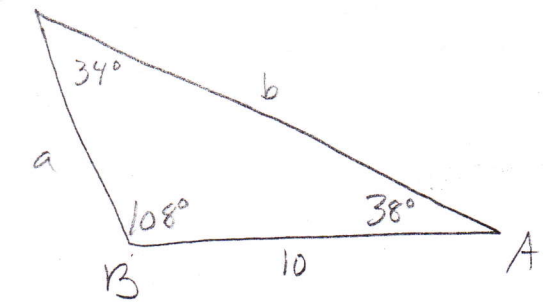
If $b = 9.5076$, then 1 $\triangle$

If $9.5076 < b < 13$, then 2 $\triangle$'s

If $b \geq 13$, then 1 $\triangle$

NO $\triangle$

(9) ASA



$C = 34°$

$\frac{a}{\sin 38°} = \frac{10}{\sin 34°}$ $\qquad$ $\frac{b}{\sin 108°} = \frac{10}{\sin 34°}$

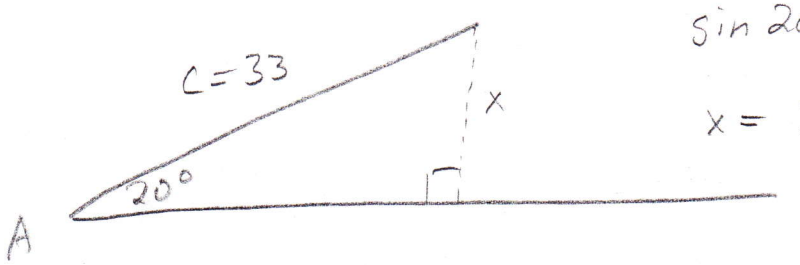
$a = \frac{10 \cdot \sin 38°}{\sin 34°}$ $\qquad$ $b = \frac{10 \cdot \sin 108°}{\sin 34°}$

$a \approx 11.0098$ $\qquad$ $b \approx 17.0076$

$a \approx 11.0$ yd $\qquad$ $b = 17.0$ yd

$C = 34°$

(10)



$\sin 20° = \frac{x}{33}$

$x = 33 \cdot \sin 20°$

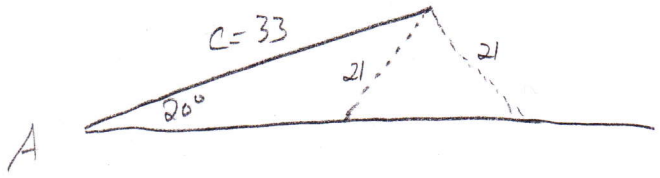
$x = 11.2867$

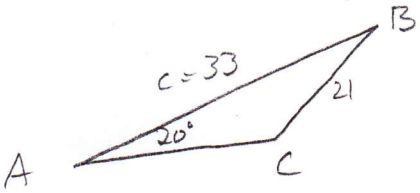
If $a < 11.2867$, then no $\triangle$'s

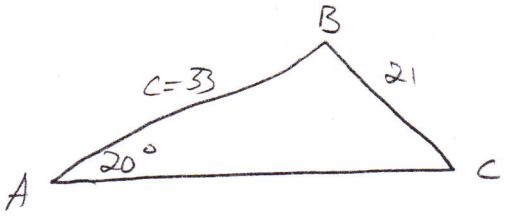
If $a = 11.2867$, then 1 $\triangle$

If $11.2867 < a < 33$, then 2 $\triangle$'s ** $a = 21$ **

If $a \geq 33$, then 1 $\triangle$







$C = 180° - 32.51°$

$C \approx 147.4890878°$

$B \approx 12.5109217°$

$\frac{b}{\sin 12.51°} = \frac{21}{\sin 20°}$

$b = \frac{21 \cdot \sin 12.51°}{\sin 20°}$

$b \approx 13.3$ m

$B = 12.5°$

$C = 147.5°$

$\frac{\sin C}{33} = \frac{\sin 20°}{21}$

$C = \sin^{-1}\left(\frac{33 \sin 20°}{21}\right)$

$C = 32.5109217°$

$B \approx 127.4890878°$

$\frac{b}{\sin 127.49°} = \frac{21}{\sin 20°}$

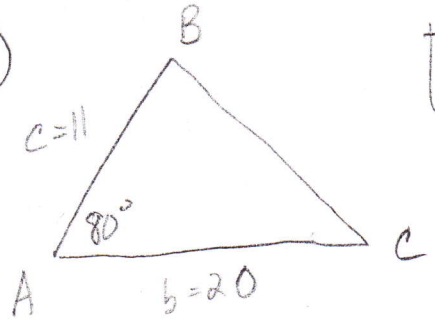
$b = \frac{21 \cdot \sin 127.49°}{\sin 20°}$

$b \approx 48.7$ m

$B \approx 127.5°$

$C = 32.5°$

(11)



SAS

$a^2 = 20^2 + 11^2 - 2(20)(11)(\cos 80°)$

$a^2 = 400 + 121 - 440 \cdot \cos 80°$

$a = \sqrt{521 - 440 \cos 80°}$

$a = 21.08541168$

$\frac{\sin C}{11} = \frac{\sin 80°}{21.09}$

$C = \sin^{-1}\left(\frac{11 \cdot \sin 80°}{21.09}\right)$

$C = 30.9°$

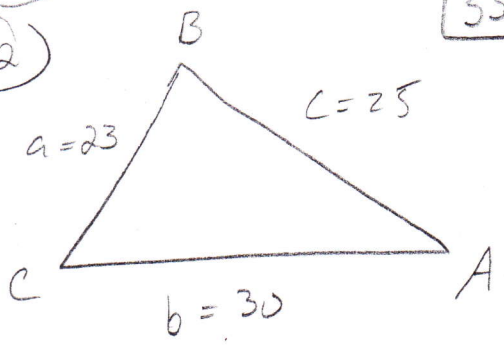
$a \approx 21.1$ mi

$C = 30.9°$

$B \approx 69.1°$

---

(12)



SSS

$23^2 = 25^2 + 30^2 - 2(25)(30)(\cos A)$

$529 = 625 + 900 - 1500 \cos A$

$529 = 1525 - 1500 \cos A$

$-996 = -1500 \cos A$

$\frac{996}{1500} = \cos A$

$A = \cos^{-1}\left(\frac{996}{1500}\right)$

$A \approx 48.39434622°$

$\frac{\sin C}{25} = \frac{\sin 48.39°}{23}$

$C = \sin^{-1}\left(\frac{25 \cdot \sin 48.39°}{23}\right)$

$C \approx 54.36576565°$

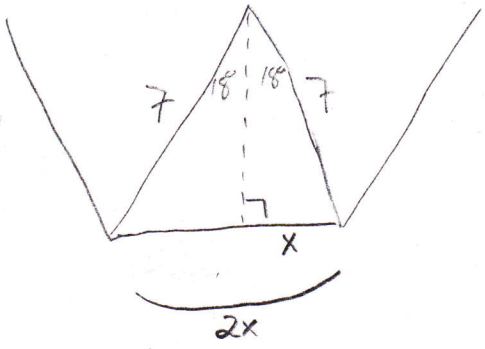
$B \approx 77.23988813°$

$A \approx 48.4°$

$B \approx 77.2°$

$C = 54.4°$

(13) decagon



central $\angle = \frac{360^\circ}{10} = 36^\circ$

$\sin 18^\circ = \frac{x}{7}$

$x = 7 \cdot \sin 18^\circ$

$x \approx 2.163118961$

$\text{Area}_\Delta = \frac{1}{2}(7)(7)(\sin 36^\circ)$

$A_\Delta = 14.400\,73868$

1 side $= 2x = 4.326237921$

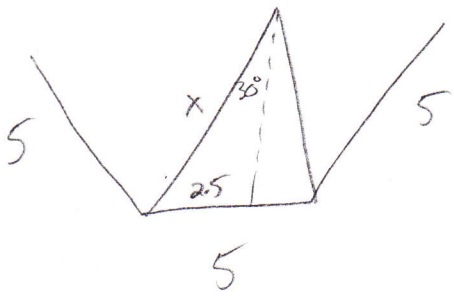
perimeter $= 10 \cdot (1 \text{ side})$

per. $= 43.3$ cm

$A_{decagon} = 144.0 \text{ cm}^2$

---

(14) hexagon



central $\angle = \frac{360^\circ}{6} = 60^\circ$

$\sin 30^\circ = \frac{2.5}{x}$

$x = \frac{2.5}{\sin 30^\circ}$

$x = 5$

$A_{1\Delta} = \frac{1}{2}(5)^2(\sin 60^\circ)$

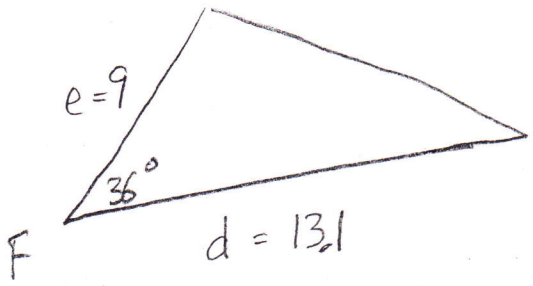
$= \frac{1}{2}(25)\left(\frac{\sqrt{3}}{2}\right)$

$= \frac{25\sqrt{3}}{4}$

$A_{Hexagon} = 6(\uparrow) = \frac{75\sqrt{3}}{2}$ or 64.9519

65.0 yd^2

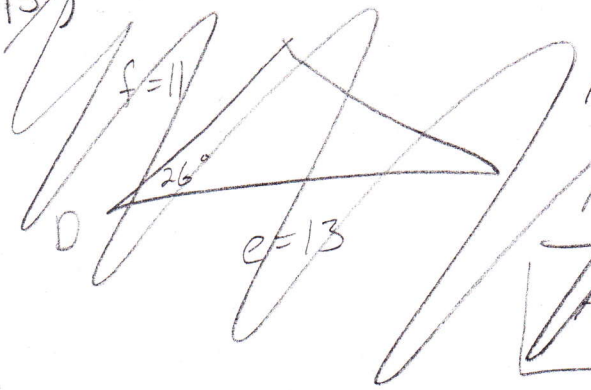
15)



$$A_{\Delta} = \frac{1}{2}(9)(13.1)(\sin 36^{\circ})$$

$$A = 34.6 \text{ in}^2$$

15)

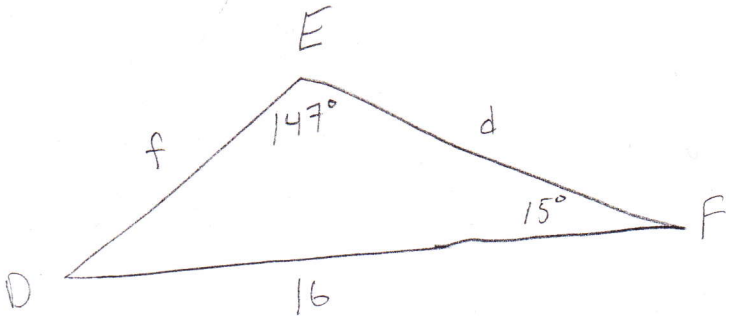


$A_\Delta = \frac{1}{2}(11)(13)(\sin 26°)$

$A_\Delta = 31.34\ 65587$

$A_\Delta \approx 31.3\ yd^2$

16)



$D = 18°$

$\frac{d}{\sin 18°} = \frac{16}{\sin 147°}$

$d = \frac{16 \cdot \sin 18°}{\sin 147°}$

$d = 9.078071148$

$A_\Delta = \frac{1}{2}(9.078)(16)(\sin 15°)$

≈ 18.79662165

$\approx 18.8\ m^2$