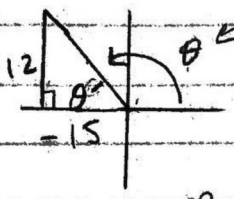
Getting Ready for Vectors WS

$\theta' \Rightarrow \theta$ Prime

1) 

angle from initial side to terminal side

$a^2+b^2=r^2$

$(-15)^2+(12)^2=r^2$

$225+144=r^2$

$369=r^2$

$r=\sqrt{369}=\boxed{3\sqrt{41}}$

$\tan\theta'=-\frac{12}{15}$

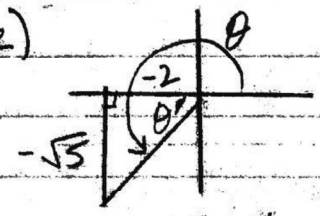
$\theta'=\tan^{-1}\left(-\frac{12}{15}\right)$

$\theta'=-38.7^\circ=38.7^\circ$

$\theta=180^\circ-38.7^\circ=\boxed{141.3^\circ}$

$\tan\theta'=-\frac{12}{15}$ opp / adj

Q2

2) 

$a^2+b^2=r^2$

$(-2)^2+(-\sqrt{5})^2=r^2$

$4+5=r^2$

$9=r^2$

$\boxed{r=3}$

$\cot\theta'=\frac{2}{\sqrt{5}}$

$\tan\theta'=\frac{\sqrt{5}}{2}$

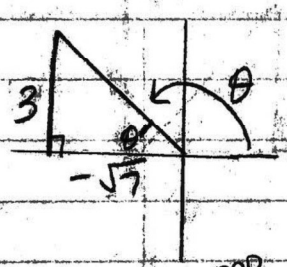
$\theta'=\tan^{-1}\frac{\sqrt{5}}{2}$

$\theta'=48.2^\circ$

$\theta=180^\circ+48.2^\circ=\boxed{228.2^\circ}$

$\cot\theta'=\frac{2}{\sqrt{5}}$ adj / opp

Q3

3) 

$a^2+b^2=r^2$

$(-\sqrt{7})^2+(3)^2=r^2$

$7+9=r^2$

$16=r^2$

$\boxed{r=4}$

$\tan\theta'=-\frac{3}{\sqrt{7}}$

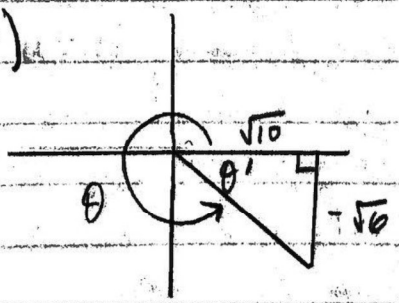
$\theta'=\tan^{-1}\frac{3}{\sqrt{7}}$

$\theta'=-48.6=48.6^\circ$

$\theta=180^\circ-48.6^\circ=\boxed{131.4^\circ}$

$\tan\theta'=-\frac{3}{\sqrt{7}}$ opp / adj

Q2

4) 

$a^2+b^2=r^2$

$(\sqrt{10})^2+(-\sqrt{6})^2=r^2$

$10+6=r^2$

$16=r^2$

$\boxed{r=4}$

$\tan\theta'=-\frac{\sqrt{6}}{\sqrt{10}}$

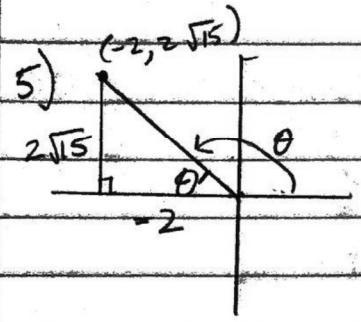
$\theta'=\tan^{-1}-\frac{\sqrt{6}}{\sqrt{10}}$

$\theta'=-37.8=37.8$

$\theta=360-37.8=\boxed{322.2^\circ}$

$\tan\theta'=\frac{-\sqrt{6}}{\sqrt{10}}$

Q4

5) 

$a^2+b^2=r^2$

$(-2)^2+(2\sqrt{15})^2=r^2$

$4+60=r^2$

$64=r^2$

$\boxed{r=8}$

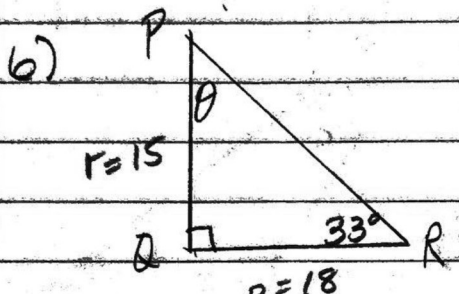
$\tan\theta' = \frac{2\sqrt{15}}{-2}$

$\tan\theta' = -\sqrt{15}$

$\theta' = \tan^{-1}-\sqrt{15}$

$\theta' = -75.5 = 75.5$

$\theta = 180 - 75.5 = \boxed{104.5^\circ}$

6) 

$a^2+b^2=c^2$

$(15)^2+(18)^2=c^2$

$225+324=c^2$

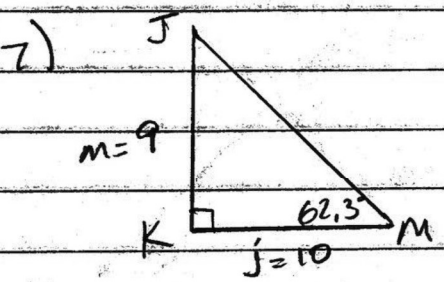
$\sqrt{549}=\sqrt{c^2}$

$9 \cdot 61$

$\boxed{c=3\sqrt{61}}$

$\theta = 90-33$

$\boxed{\theta = 57^\circ}$

7) 

$a^2+b^2=c^2$

$(9)^2+(10)^2=c^2$

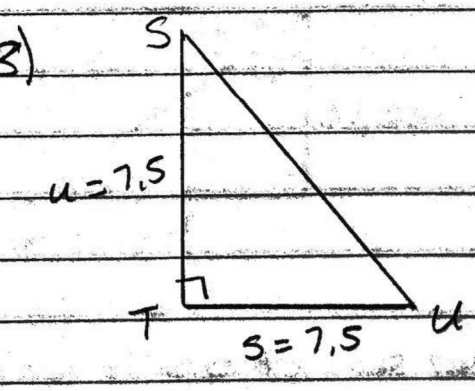
$81+100=c^2$

$181=c^2$

$\boxed{c=\sqrt{181}}$

$\theta = 90^\circ - 62.3^\circ$

$\boxed{\theta = 27.7^\circ}$

8) 

$a^2+b^2=c^2$

$(7.5)^2+(7.5)^2=c^2$

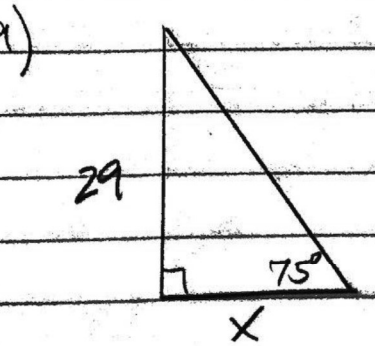
$56.25+56.25=c^2$

$112.5=c^2$

$\boxed{c=\sqrt{112.5}}$

Both legs are 7.5 so it is a 45°-45°-90° Δ

$\theta = \boxed{45^\circ}$

9) 

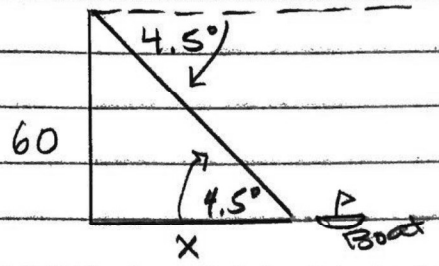
$\tan 75^\circ = \frac{29}{x}$

$x \tan 75^\circ = 29$

$x = \frac{29}{\tan 75^\circ}$

$\boxed{x = 7.8 \text{ ft.}}$

10)

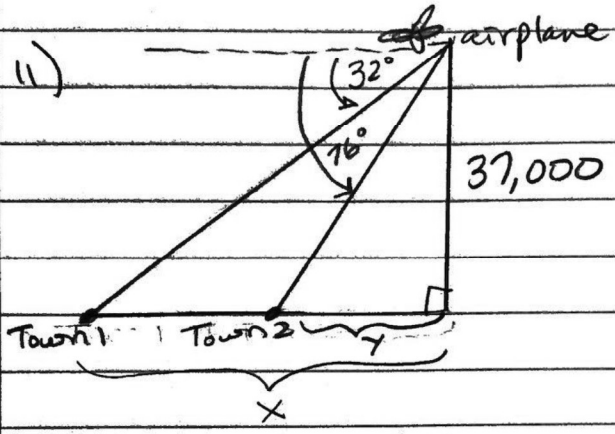


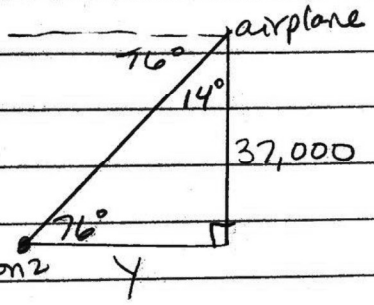
$\tan 4.5 = \frac{60}{x}$

$x \tan 45 = 60$

$x = \frac{60}{\tan 45}$ $\boxed{x = 762.4 \text{ ft.}}$

11)

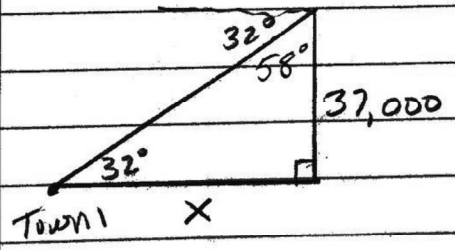




$\tan 14° = \frac{Y}{37{,}000}$

$37{,}000 \tan 14° = Y$

$Y = 9225.1$



$\tan 58° = \frac{X}{37{,}000}$

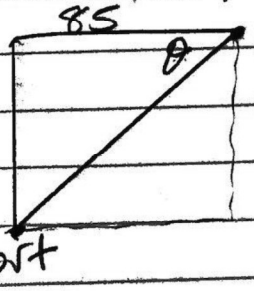
$37{,}000 \tan 58° = X$

$X = 59{,}212.4$

Find the distance between town 1 & town 2: $X - Y$

$59{,}212.4 - 9225.1 =$ $\boxed{49987.3 \text{ ft.}}$

12)



$\tan \theta = \frac{160}{85}$

$\theta = \tan^{-1}\left(\frac{160}{85}\right)$

$\theta = 62°$ or $90° - 62° = 28°$

$\boxed{W\ 62°\ S}$ $\boxed{S\ 28°\ W}$

13) $a^2 = b^2 + c^2 - 2bc\cos A$

$15^2 = 18^2 + 20^2 - 2(18)(20)\cos A$

$225 = 724 - 720\cos A$

$-724 \quad -724$

$\frac{-499}{-720} = \frac{-720\cos A}{-720}$

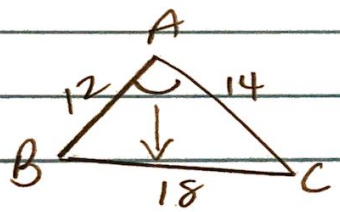
$A = \cos^{-1}\left(\frac{499}{720}\right)$ $\boxed{A = 46.1^\circ}$

14) $a = \sqrt{b^2 + c^2 - 2bc\cos A}$

$a = \sqrt{40^2 + 45^2 - 2(40)(45)\cos 51^\circ}$

$\boxed{a = 36.9}$

15)



$a^2 = b^2 + c^2 - 2bc\cos A$

$18^2 = 14^2 + 12^2 - 2(14)(12)\cos A$

$324 = 340 - 336\cos A$

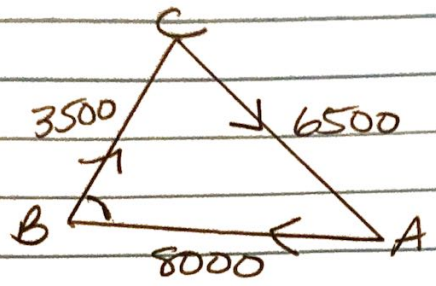
$-340 \quad -340$

$\frac{-16}{-336} = \frac{-336\cos A}{-336}$

$A = \cos^{-1}\left(\frac{16}{336}\right)$

$\boxed{A = 87.3^\circ}$

16)



$b^2 = a^2 + c^2 - 2ac\cos B$

$6500^2 = 3500^2 + 8000^2 - 2(3500)(8000)\cos B$

$-3500^2 \quad -8000^2$

$-34{,}000{,}000 = -56{,}000{,}000\cos B$

$\frac{34}{56} = \cos B$

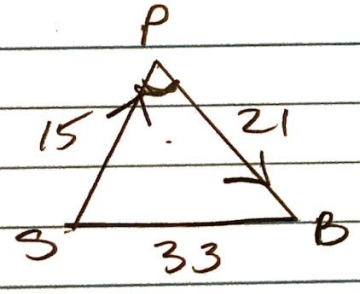
$B = \cos^{-1}\left(\frac{34}{56}\right)$

$B = 52.6^\circ$

$\boxed{E\ 52.6^\circ\ N}$ OR

$90 - 52.6 = 37.4$ $\boxed{N\ 37.4^\circ\ E}$

17)



$p^2 = s^2 + b^2 - 2sb\cos P$

$33^2 = 21^2 + 15^2 - 2(21)(15)\cos P$

$1089 = 666 - 630\cos P$

$-666 \quad -666$

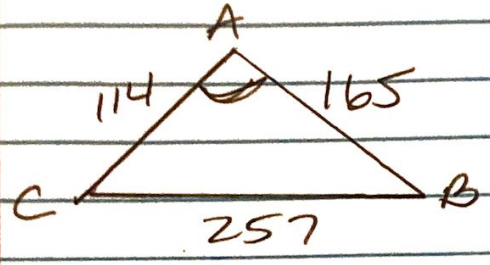
$423 = -630\cos P$

$-\frac{423}{630} = \cos P$

$P = \cos^{-1}\left(-\frac{423}{630}\right)$

$\boxed{P = 132.2^\circ}$

18)



$a^2 = b^2 + c^2 - 2bc\cos A$

$257^2 = 114^2 + 165^2 - 2(114)(165)\cos A$

$66{,}049 = 40{,}221 - 37620\cos A$

$-40{,}221 \quad -40{,}221$

$25{,}828 = -37620\cos A$

$\frac{25{,}828}{-37620} = \cos A$

$A = \cos^{-1}\left(-\frac{25828}{37620}\right)$

$\boxed{A = 133.4^\circ}$