Chapter 6 Test Review

Part I: Work these problems without the calculator.

1. Find the following trigonometric functions of the angle in standard position whose terminal side passes through $(-8, 5)$.

a) $\sin\theta = \frac{5\sqrt{89}}{89}$ ($\frac{o}{h}$)

b) $\sec\theta = \frac{-\sqrt{89}}{8}$ ($\frac{h}{a}$, $\frac{a}{o}$)

c) $\cot\theta = \frac{-8}{5}$

$64+25=89$

2. Find the exact values of the angles:

a. cos 330 $\frac{\sqrt{3}}{2}$

b. tan 225 1

c. sin (-240) $\approx 120°$ $\frac{\sqrt{3}}{2}$

d. csc 30 $\frac{1}{\sin}$ 2

e. sec (-270) $\approx 90°$ $\frac{1}{\cos}$ undefined

f. cot (-405) $\approx 315°$ -1

g. csc (-60) $\frac{1}{\sin}$ $\frac{-2\sqrt{3}}{3}$

h. cos 135 $\frac{-\sqrt{2}}{2}$

i. tan 240 $\sqrt{3}$

j. cos 180 -1

k. tan 0 0

3. $\csc\left(-\frac{7\pi}{6}\right) \approx \frac{5\pi}{6}$ $\frac{1}{\sin}$ 2

4. $\tan\left(\frac{4\pi}{3}\right)$ $\sqrt{3}$

5. $\cos\left(\frac{9\pi}{4}\right) \approx \frac{\pi}{4}$ $\frac{\sqrt{2}}{2}$

6. $\cot\left(-\frac{\pi}{6}\right)$ $-\sqrt{3}$

7. $\sin\left(\frac{3\pi}{2}\right)$ -1

8. $\sec(-\pi)$ $\frac{1}{\cos}$ -1

Part II: Work these problems without the calculator.

9. $Sin^{-1}(1)$

I & III → $\frac{\pi}{2}$

10. $Cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$

I → $\frac{\pi}{4}$

11. $Cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

II → $\frac{5\pi}{6}$

12. $Sin^{-1}\left(-\frac{1}{2}\right)$

IV → $\frac{-\pi}{6}$

13. $Sin^{-1}\left[\sin\left(-\frac{4\pi}{3}\right)\right]$ → $\frac{2\pi}{3}$

$Sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

I → $\frac{\pi}{3}$

14. $\cos\left[Sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right]$

I → $\frac{\pi}{3}$

$\cos(\pi/3) \rightarrow \frac{1}{2}$

15. $\tan\left[Cos^{-1}\left(\frac{\sqrt{2}}{2}\right)\right]$

I

$\tan(\pi/4) = 1$

16. $Tan^{-1}(-\sqrt{3})$

IV

$\frac{-\sqrt{3}}{1} = \frac{-\sqrt{3}/2}{1/2}$

$\frac{-\pi}{3}$

17. $\sec\left[Cot^{-1}\left(-\frac{\sqrt{3}}{3}\right)\right]$ → or $Tan^{-1}(-\sqrt{3})$

$\frac{-1/2}{\sqrt{3}/2}$

$Sec(-\pi/3) = 2$

$\frac{1}{\cos}$

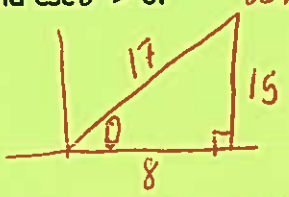
Part III: You will need the help of a calculator for these problems.

18 Find $\cot\theta$ if $\cos\theta = \frac{8}{17}$ and $\csc\theta > 0$.

Where is cos positive & csc positive? I

Sin csc +	All +
Tan cot +	cos sec +

$\frac{a}{0}$

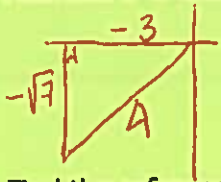


$\cot\theta = \frac{8}{15}$

19. Find $\sec\theta$ if $\tan\theta = \frac{\sqrt{7}}{3}$ and $\sec\theta < 0$.

Where is tan positive and sec negative? II

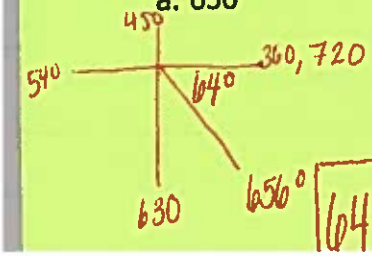
7 + 9 = 16



$\sec\theta = \frac{-4}{3}$

20. Find the reference angles:

a. 656

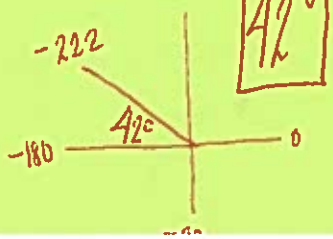


640

b. -18

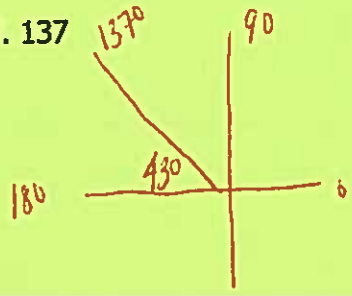
18°

c. -222



42°

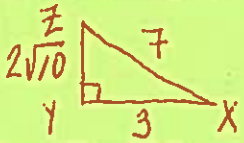
d. 137



43°

On 21 and 22 use the right triangle XYZ where ∠Y is the right angle.

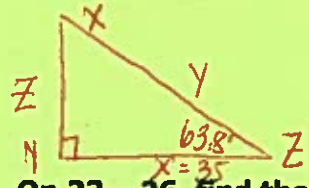
21. z = 3 and y = 7 find measure of side x and ∠Z to the nearest tenth.



$49-9=40$ $\sqrt{40}=2\sqrt{10}$ or 6.3 $=x$ $\cos^{-1}\left(\frac{3}{7}\right)=$ **$x=64.6°$**

$Z=25.4°$

22. ∠Z = 63.8 and x = 35 find the measure of side y and side z.

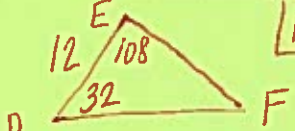


$\tan 63.8° = \frac{Z}{35}$ **$Z=71.1$**

$71.1^2+35^2=y^2$ **$y=79.2$**

On 23 – 26, find the angles and sides to the nearest tenth. Find all measures if two solutions exist.

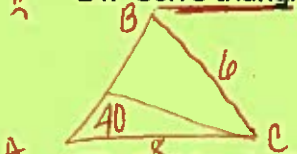
23. In triangle DEF if ∠D = 32, ∠E = 108 and f = 12, find the measure of sides d and e.



$F=40°$ **$d=9.9$** **$e=17.8$**

$\frac{\sin 40}{12}=\frac{\sin 108}{e}$ $\frac{\sin 40}{12}=\frac{\sin 32°}{d}$ $d=\frac{12\cdot\sin 32°}{\sin 40°}$

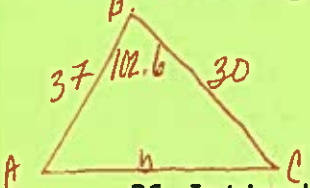
24. Solve triangle ABC if ∠A = 40, a = 6 and b = 8.



$\frac{\sin 40}{6}=\frac{\sin B}{8}=\frac{\sin 81}{c}$ **$B=59°$** **$C=81°$** **$c=9.2$**

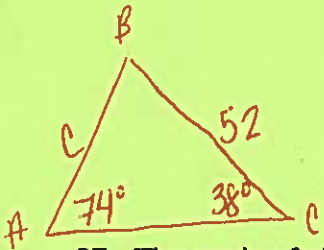
or $\frac{\sin 40}{6}=\frac{\sin 121}{8}=\frac{\sin 19}{c}$ **$B=121°$** **$C=19°$** **$c=3.0$**

25. In triangle ABC, a = 30, c = 37 and ∠B = 102.6. Find the measure of side b.



$b^2=37^2+30^2-2\cdot37\cdot30\cdot\cos 102.6$ **$b=52.5$**

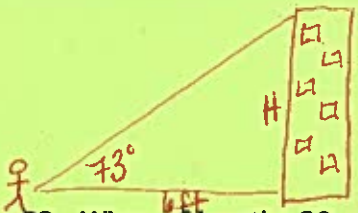
26. In triangle ABC, a = 52, ∠A = 74, and ∠C = 38. Find the measure of side c.



$\frac{\sin 74°}{52}=\frac{\sin 38°}{c}$ **$c=33.3$**

$c=\frac{52\cdot\sin 38°}{\sin 74°}$

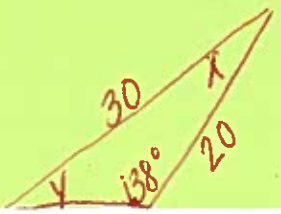
27. The angle of elevation from an observer on the street to the top of a building is 73°. If the observer is 6 ft. from the base of the building, how tall is the building?



$\tan 73° = \frac{H}{6}$ **$H=19.6ft$**

$6\cdot\tan 73°=H$

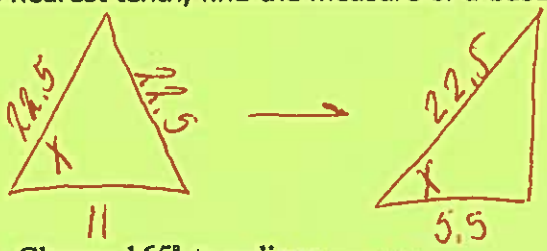
28. Wires of lengths 20 m and 30 m extend from the top of a tower to the ground on the same side of the tower. The shorter wire makes an angle of 42° with the ground. What angle do the wires make with each other?



$\frac{\sin 138}{30}=\frac{\sin y}{20}$ $y=26.5°$

$180-138-26.5=$ **$X=15.5°$**

29. In an isosceles triangle the legs have a measure of 22.5 and the base has a measure of 11. To the nearest tenth, find the measure of a base angle.



$\cos^{-1}\left(\frac{5.5}{22.5}\right) = \boxed{75.9^\circ}$

30. Change 165° to radians.

$165^\circ \cdot \frac{\pi}{180^\circ} = \boxed{\frac{11\pi}{12}}$

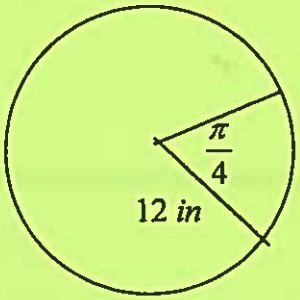
31. Change $\frac{7\pi}{10}$ into degrees.

$\frac{7\pi}{10} \cdot \frac{180^\circ}{\pi} = 7 \cdot 18^\circ = \boxed{126^\circ}$

Given the Circle, find the Arc Length and the Area of the Sector.

$S = r \cdot \theta \quad A = \frac{1}{2} r^2 \cdot \theta$

32.



S= $\frac{12 \cdot \pi}{4} = \boxed{3\pi}$

A= $\boxed{18\pi}$ $\frac{1}{2} \cdot 144 \cdot \frac{\pi}{4}$

33.

$\frac{52 \cdot \pi}{180} = \theta = \frac{13\pi}{45}$

S= $\boxed{\frac{520}{9}\pi}$

oops

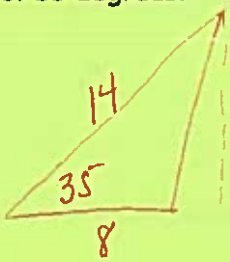
A= $\frac{1}{2} \cdot 40{,}000 \cdot \frac{13\pi}{45}$ $\boxed{\frac{52{,}000}{9}\pi}$

$200 \cdot \frac{13\pi}{45}$

34. Find the area of the triangle with sides of length 8 and 14 and the included angle of 35 degrees.

6.3 → $A = \frac{1}{2} \cdot a \cdot b \cdot \sin\theta$ $A = \frac{1}{2} \cdot 8 \cdot 14 \cdot \sin 35$

$= \boxed{32.1 u^2}$



35. Find the area of a triangle with sides of length 5, 6, and 8.

$P = 19 \quad S = 9.5$

$A = \sqrt{9.5 \cdot 4.5 \cdot 3.5 \cdot 1.5} = \boxed{15 u^2}$