

Lectures 16-18

Show all work in the space provided and circle final answers.

1. Convert -312° to radians. 2. Convert $\frac{7\pi}{5}$ to radians.
3. When angle θ is placed in standard position, its terminal side passes through $(-2, -4)$. Find the values for all six trig functions.

$\sin \theta$ _____ $\cos \theta$ _____ $\tan \theta$ _____ $\sec \theta$ _____ , $\csc \theta$ _____ $\cot \theta$ _____

4. When angle θ is placed in standard position, its terminal side passes through $(-3, -2)$. Find the values for all six trig functions.

$\sin \theta$ _____ $\cos \theta$ _____ $\tan \theta$ _____ $\sec \theta$ _____ , $\csc \theta$ _____ $\cot \theta$ _____

5. Given $\cot x = -\frac{8}{15}$ and $\frac{3\pi}{2} \leq x \leq 2\pi$, find the other 5 trig function values.

$\sin \theta$ _____ $\cos \theta$ _____ $\tan \theta$ _____ $\sec \theta$ _____ , $\csc \theta$ _____

6. Given $\cot x = -\frac{24}{7}$ and $\frac{3\pi}{2} \leq x \leq 2\pi$, find the other 5 trig function values.

$\sin \theta$ _____ $\cos \theta$ _____ $\tan \theta$ _____ $\sec \theta$ _____ , $\csc \theta$ _____

Fill in the chart completely.

	7.	8.	9.	10.	11.	12.	13.	14
θ	135°	$\frac{5\pi}{3}$	21π		225°	$\frac{7\pi}{6}$	$\frac{21\pi}{2}$	
Sin								
Cos								
Tan								1
Cot				$\sqrt{3}$				
Sec								
Csc				2				$\sqrt{2}$

15. If $\sec a = -\frac{4}{3}$ $\left(\frac{\pi}{2} \leq a \leq \pi\right)$ and $\tan b = \frac{4}{3}$ $\left(\frac{3\pi}{2} \leq b \leq 2\pi\right)$ find the following:

a) $\sin(b - a)$

b) $\cos(b - a)$

c) quadrant of $(b - a)$ (Why?)

d) $\sin \frac{b}{2}$ (show sign choice)

e) $\tan 2b$

f) $\sec 2a$

16. If $\sec \alpha = \frac{3}{2}$ $\left(\frac{3\pi}{2} \leq \alpha \leq 2\pi\right)$ and $\tan \beta = -\frac{5}{12}$ $\left(\frac{\pi}{2} \leq \beta \leq \pi\right)$ find each of the following:

a) $\sin(\alpha + \beta)$

b) $\cos(\alpha + \beta)$

c) quadrant of $(\alpha + \beta)$ (Why?)

d) $\cos \frac{\alpha}{2}$

e) $\cot 2\beta$

f) $\csc 2\alpha$

Find the following:

17. $\sin 345^\circ$

18. $\tan \frac{7\pi}{8}$

19. $\sin 285^\circ$

20. $\tan \frac{3\pi}{8}$

21. $\cos 75^\circ$ by angle addition

22. $\cos 75^\circ$ by half angle

23. $\tan 22\frac{1}{2}^\circ$

24. $\csc 15^\circ$

Evaluate the following:

25. $1 - 2 \sin^2 \frac{11\pi}{12}$

26. $\frac{\tan \frac{\pi}{16} + \tan \frac{3\pi}{16}}{1 - \tan \frac{\pi}{16} \tan \frac{3\pi}{16}}$

27. $20 \sin \frac{\pi}{12} \cos \frac{\pi}{12}$

28. $\frac{\tan 193^\circ - \tan 13^\circ}{1 + \tan 193^\circ \tan 13^\circ}$

29. $100 \sin \frac{5\pi}{12} \cos \frac{5\pi}{12}$

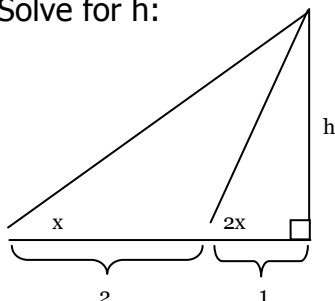
30. $\frac{1}{\cos 96^\circ \cos 24^\circ - \sin 96^\circ \sin 24^\circ}$

Prove the following identities

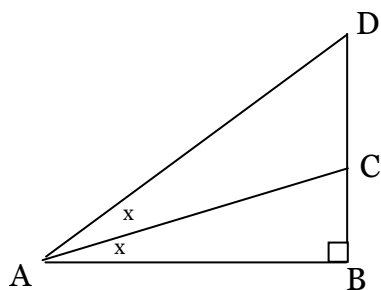
$$31. \cos 2x = \frac{1 - \tan^2 x}{1 + \tan^2 x}$$

$$32. (\sin 2x)^2 = \frac{4 \sin^2 x}{1 + \tan^2 x}$$

33. Solve for h:



34. Solve for h, given AB = 4, AC = 5, AD = h (hint: use cosine)



35. Simplify $12 \sec^2 x - 12 \tan^2 x$

ANSWERS:

$$1. -\frac{26\pi}{15}$$

$$2. 252^\circ$$

$$3. \sin \theta = -\frac{2\sqrt{5}}{5} \quad \cos \theta = -\frac{\sqrt{5}}{5} \quad \tan \theta = 2 \quad \sec \theta = -\sqrt{5} \quad \csc \theta = -\frac{\sqrt{5}}{2} \quad \cot \theta = \frac{1}{2}$$

$$4. \sin \theta = -\frac{2\sqrt{13}}{13} \quad \cos \theta = -\frac{3\sqrt{13}}{13} \quad \tan \theta = \frac{2}{3} \quad \sec \theta = -\frac{\sqrt{13}}{3} \quad \csc \theta = -\frac{\sqrt{13}}{2} \quad \cot \theta = \frac{3}{2}$$

$$5. \sin \theta = -\frac{15}{17} \quad \cos \theta = \frac{8}{17} \quad \tan \theta = -\frac{15}{8} \quad \sec \theta = \frac{17}{8} \quad \csc \theta = -\frac{17}{15}$$

$$6. \sin \theta = -\frac{7}{25} \quad \cos \theta = \frac{24}{25} \quad \tan \theta = -\frac{7}{24} \quad \sec \theta = \frac{25}{24} \quad \csc \theta = -\frac{25}{7}$$

	7.	8.	9.	10.	11.	12.	13.	14
θ	135°	$\frac{5\pi}{3}$	21π	30	225°	$\frac{7\pi}{6}$	$\frac{21\pi}{2}$	45
Sin	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	0	$\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	1	$\frac{\sqrt{2}}{2}$
Cos	$-\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	-1	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	0	$\frac{\sqrt{2}}{2}$
Tan	-1	$-\sqrt{3}$	0	$\frac{\sqrt{3}}{3}$	1	$\frac{\sqrt{3}}{3}$	DNE	1
Cot	-1	$-\frac{\sqrt{3}}{3}$	DNE	$\sqrt{3}$	1	$\sqrt{3}$	0	1
Sec	$-\sqrt{2}$	2	-1	$\frac{\sqrt{3}}{3}$	$-\sqrt{2}$	$-\frac{\sqrt{3}}{3}$	DNE	$\sqrt{2}$
Csc	$\sqrt{2}$	$\frac{2\sqrt{3}}{3}$	DNE	2	$-\sqrt{2}$	-2	1	$\sqrt{2}$

15. a) $\frac{12-3\sqrt{7}}{20}$ b) $\frac{-9-4\sqrt{7}}{20}$ c) 2 d) $+\frac{\sqrt{5}}{5}$ e) $\frac{24}{7}$ f) 8

16. a) $\frac{12\sqrt{5}+10}{39}$ b) $\frac{-24+5\sqrt{5}}{39}$ c) 2 d) $-\frac{\sqrt{30}}{6}$ e) $-\frac{119}{120}$ f) $-\frac{9\sqrt{5}}{20}$

17. $\frac{\sqrt{2}-\sqrt{6}}{4}$ 18. $-\sqrt{2}+1$ 19. $\frac{-\sqrt{2}-\sqrt{6}}{4}$ 20. $\sqrt{2}+1$

21. $\frac{\sqrt{6}-\sqrt{2}}{4}$ 22. $\frac{\sqrt{2}-\sqrt{3}}{2}$ 23. $\sqrt{2}-1$ 24. $\sqrt{6}+\sqrt{2}$

25. $\frac{\sqrt{3}}{2}$ 26. 1

27. 5 28. 0

29. 25 30. -2

33. $\sqrt{3}$ 34. $\frac{100}{7}$ 35. 12