Saturday, November 25, 2017
4:14 PM

Chapter Review exercises for 4.2-4.3 25-31 odd ,37-43 odd,47-55 odd

4.2 In Exercises 25–28, find the point (x, y) on the unit circle that corresponds to the real number t.

25) $t = \frac{2\pi}{3}$

point: $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$

27) $t = \frac{5\pi}{6}$

point: $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$

In Exercises 29–32, evaluate (if possible) the six trigonometric functions of the real number.

$\sin t = y$ $\csc t = \frac{1}{y}$

$\cos t = x$ $\sec t = \frac{1}{x}$

$\tan t = \frac{y}{x}$ $\cot t = \frac{x}{y}$

29) $t = \frac{7\pi}{6}$ point: $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$

$\sin(t) = y = \boxed{-\frac{1}{2}}$ $\csc(t) = \boxed{-2}$

$\cos(t) = x = \boxed{-\frac{\sqrt{3}}{2}}$ $\sec(t) = -\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{-\frac{2\sqrt{3}}{3}}$

$\tan(t) = \frac{y}{x} = \frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}}$ $\cot(t) = \boxed{\sqrt{3}}$

$= -\frac{1}{2} \cdot (-\frac{2}{\sqrt{3}}) = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{\sqrt{3}}{3}}$

31) $t = -\frac{2\pi}{3}$ point: $(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$

$\sin(t) = y = \boxed{-\frac{\sqrt{3}}{2}}$ $\csc(t) = -\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{-\frac{2\sqrt{3}}{3}}$

$\cos(t) = x = \boxed{-\frac{1}{2}}$ $\sec(t) = \boxed{-2}$

$\tan(t) = \frac{y}{x} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}}$ $\cot(t) = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{\sqrt{3}}{3}}$

$= -\frac{\sqrt{3}}{2} \cdot (-\frac{2}{1}) = \boxed{\sqrt{3}}$

In Exercises 37–40, use a calculator to evaluate the trigonometric function. Round your answer to four decimal places.

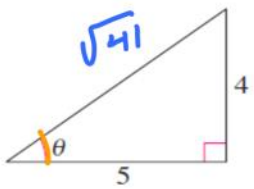
37) $\tan 33 = -75.3130$

* radian mode! (no ° symbol)

39) $\sec \frac{12\pi}{5} = \frac{1}{\cos \frac{12\pi}{5}} = 3.2361$

4.3 In Exercises 41 and 43 find the exact values of the six trigonometric functions of the angle θ shown in the figure.

41.



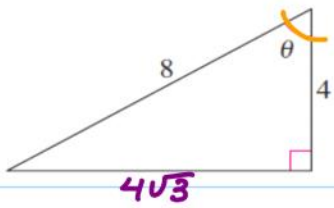
$a^2 + b^2 = c^2$
$4^2 + 5^2 = c^2$
$16 + 25 = c^2$
$41 = c^2$
$c = \sqrt{41}$

o/h $\sin\theta = \frac{4}{\sqrt{41}} \cdot \frac{\sqrt{41}}{\sqrt{41}} = \frac{4\sqrt{41}}{41}$ $\quad \csc\theta = \frac{\sqrt{41}}{4}$

a/h $\cos\theta = \frac{5}{\sqrt{41}} \cdot \frac{\sqrt{41}}{\sqrt{41}} = \frac{5\sqrt{41}}{41}$ $\quad \sec\theta = \frac{\sqrt{41}}{5}$

o/a $\tan\theta = \frac{4}{5}$ $\quad \cot\theta = \frac{5}{4}$

43.



$a^2 + 4^2 = 8^2$
$a^2 + 16 = 64$
$a^2 = 48$
$a = \sqrt{48} = \sqrt{16 \cdot 3} = 4\sqrt{3}$

o/h $\sin\theta = \frac{4\sqrt{3}}{8} = \frac{\sqrt{3}}{2}$ $\quad \csc\theta = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

a/h $\cos\theta = \frac{4}{8} = \frac{1}{2}$ $\quad \sec\theta = 2$

o/a $\tan\theta = \frac{4\sqrt{3}}{4} = \sqrt{3}$ $\quad \cot\theta = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

In Exercises 45 – 48 use the given function value and trigonometric identities (including the cofunction identities) to find the indicated trigonometric functions.

* Pythagorean Identity
$\sin^2\theta + \cos^2\theta = 1$
$(\frac{1}{4})^2 + \cos^2\theta = 1$
$\frac{1}{16} + \cos^2\theta = 1$
$\cos^2\theta = \frac{15}{16}$
$\cos\theta = \sqrt{\frac{15}{16}}$

47. $\csc\theta = 4$ (a) $\sin\theta$ (b) $\cos\theta$ (c) $\sec\theta$ (d) $\tan\theta$

a) $\sin\theta = \frac{1}{\csc\theta} = \boxed{\frac{1}{4}}$

b) $\cos\theta = \boxed{\frac{\sqrt{15}}{4}}$

c) $\sec\theta = \frac{1}{\cos\theta} = \frac{4}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \boxed{\frac{4\sqrt{15}}{15}}$

d) $\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{\frac{1}{4}}{\frac{\sqrt{15}}{4}} = \frac{1}{4} \cdot \frac{4}{\sqrt{15}} = \frac{1}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \boxed{\frac{\sqrt{15}}{15}}$

In Exercises 49 – 54, use a calculator to evaluate the trigonometric function. Round your answer to four decimal places.

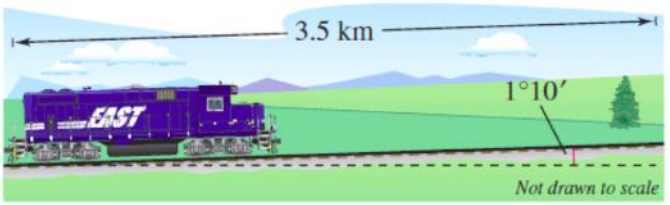
* Degree mode!

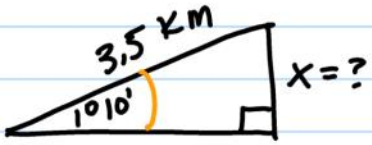
49) $\tan 33° = \boxed{.6494}$

51) $\sin 34.2° = \boxed{.5621}$

53) $\cot 15°14' = \frac{1}{\tan 15°14'} = \boxed{3.6722}$

55. **RAILROAD GRADE** A train travels 3.5 kilometers on a straight track with a grade of 1° 10′ (see figure on the next page). What is the vertical rise of the train in that distance?



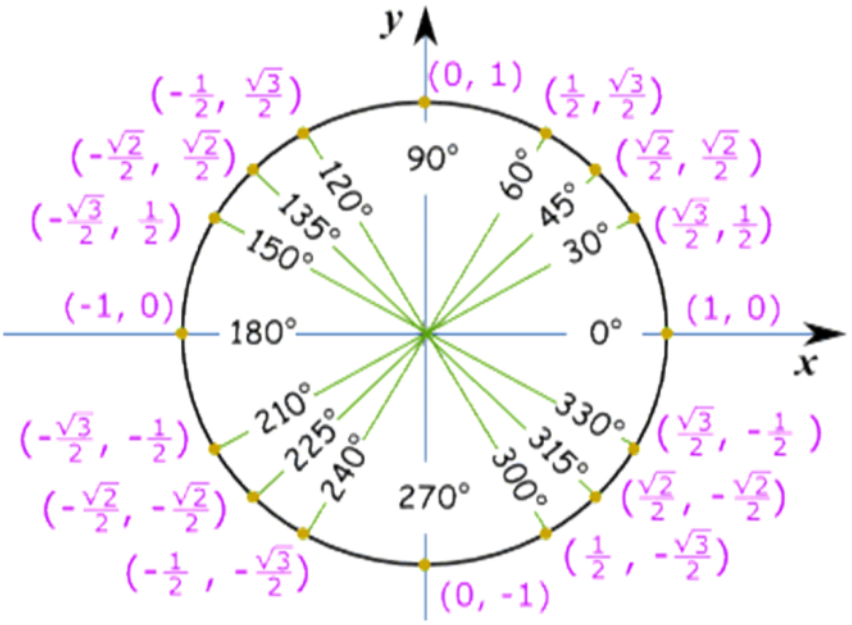


$\sin 1°10' = \frac{x}{3.5}$

$3.5(\sin 1° 10') = x$

$\boxed{x = .0713 \text{ KM}}$

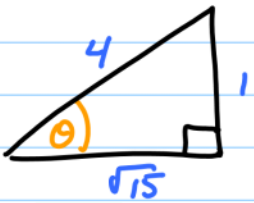
The Unit Circle



* Alternative method:

47. $\csc\theta = 4$ (a) $\sin\theta$ (b) $\cos\theta$ (c) $\sec\theta$ (d) $\tan\theta$

$\frac{hyp}{opp} = \frac{4}{1}$



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

$1^2+b^2=4^2$

$b^2=15$

$b=\sqrt{15}$

a) $\sin\theta = \frac{1}{4}$ (o/h)

b) $\cos\theta = \frac{\sqrt{15}}{4}$ (a/h)

c) $\sec\theta = \frac{4}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \frac{4\sqrt{15}}{15}$ (h/a)

d) $\tan\theta = \frac{1}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \frac{\sqrt{15}}{15}$ (o/a)