

Non-Calculator

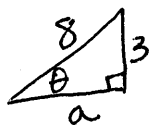
1. Convert $\frac{14\pi}{6}$ to degrees.

$$\frac{14\pi \text{ radians}}{6} \left| \frac{360^\circ}{2\pi \text{ rad.}} \right. = \boxed{420^\circ}$$

2. Convert 65° to radians.

$$\frac{65^\circ}{180^\circ} \left| \frac{\pi \text{ radians}}{360} \right. = \boxed{\frac{13\pi}{36}}$$

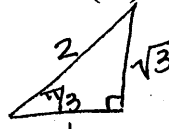
3. If $\csc \theta = \frac{8}{3}$, find $\tan \theta$.



$$\begin{aligned} a^2 + 3^2 &= 8^2 \\ a^2 &= 55 \\ a &= \sqrt{55} \end{aligned}$$

$$\boxed{\tan \theta = \frac{3}{\sqrt{55}}}$$

4. Find $\sec\left(\frac{\pi}{3}\right)$.

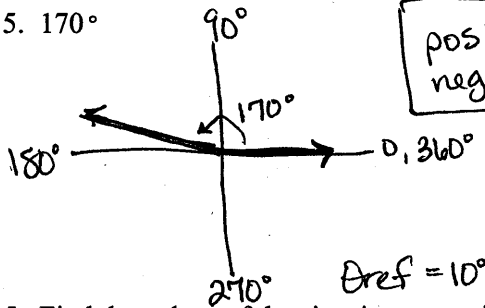


$$\cos \frac{\pi}{3} = \frac{1}{2}$$

$$\boxed{\sec\left(\frac{\pi}{3}\right) = 2}$$

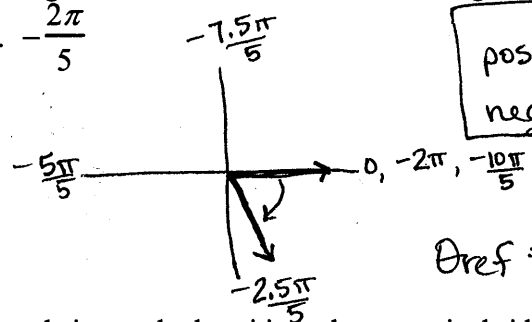
Sketch the angle. Find one positive angle and one negative angle that are coterminal with each angle.

5. 170°



$$\begin{aligned} \text{pos: } &530^\circ \\ \text{neg: } &-190^\circ \end{aligned}$$

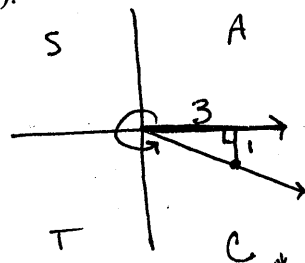
6. $-\frac{2\pi}{5}$



$$\begin{aligned} \text{pos: } &\frac{8\pi}{5} \\ \text{neg: } &-\frac{12\pi}{5} \end{aligned}$$

$$\theta_{\text{ref}} = \frac{2\pi}{5}$$

7. Find the values of the six trigonometric functions of an angle in standard position whose terminal side passes through $(3, -1)$.



$$\begin{aligned} 1^2 + 3^2 &= c^2 \\ 1 + 9 &= c^2 \\ \sqrt{10} &= c \end{aligned}$$

* Cosine/secant positive

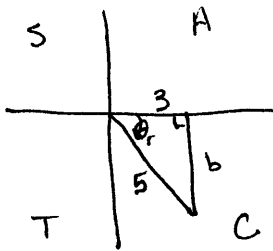
$$\begin{aligned} \sin \theta &= -\frac{1}{\sqrt{10}} & \csc \theta &= -\sqrt{10} \\ \cos \theta &= \frac{3}{\sqrt{10}} & \sec \theta &= \frac{\sqrt{10}}{3} \\ \tan \theta &= -\frac{1}{3} & \cot \theta &= -3 \end{aligned}$$

For each function, find the values of the remaining five trigonometric functions of θ with the given info.

8. $\cos \theta = \frac{3}{5}$; $\tan \theta < 0$
neg

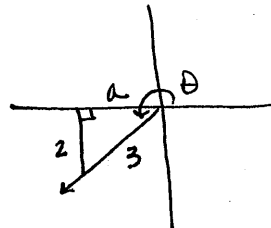
9. $\sin \theta = -\frac{2}{3}$; $\tan \theta > 0$
where is $\tan \theta$ neg and $\cos \theta$ pos? QIV

where is $\sin \theta$ neg & $\tan \theta$ pos? QIII



$$\begin{aligned} 3^2 + b^2 &= 5^2 \\ b^2 &= 16 \\ b &= 4 \end{aligned}$$

$$\begin{aligned} \sin \theta &= -\frac{4}{5} \\ \tan \theta &= -\frac{4}{3} \\ \csc \theta &= -\frac{5}{4} \\ \sec \theta &= \frac{5}{3} \\ \cot \theta &= -\frac{3}{4} \end{aligned}$$



$$\begin{aligned} 2^2 + a^2 &= 3^2 \\ a^2 &= 5 \\ a &= \sqrt{5} \end{aligned}$$

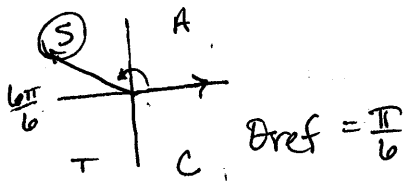
$$\begin{aligned} \cos \theta &= -\frac{\sqrt{5}}{3} \\ \tan \theta &= \frac{2}{\sqrt{5}} \\ \csc \theta &= -\frac{3}{2} \\ \sec \theta &= -\frac{3}{\sqrt{5}} \\ \cot \theta &= \frac{\sqrt{5}}{2} \end{aligned}$$

① Graph θ & list θ_{ref}

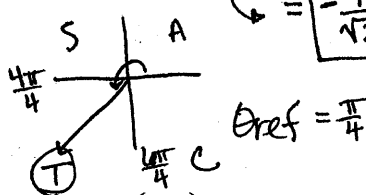
Find each exact value. Be sure to **SHOW WORK!** ② List special rt Δ OR Chart!

	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$
S	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
C	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
T	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$

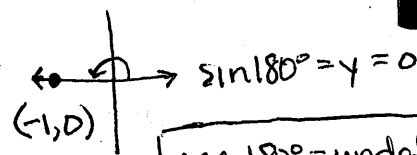
10. $\sin\left(\frac{5\pi}{6}\right) = \frac{1}{2}$



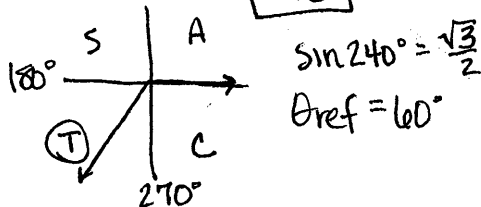
11. $\cos\left(\frac{5\pi}{4}\right) = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$



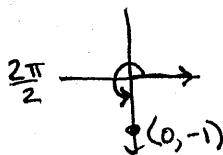
12. $\csc 180^\circ = \frac{1}{\sin 180^\circ} = \frac{1}{0} = \text{undef.}$



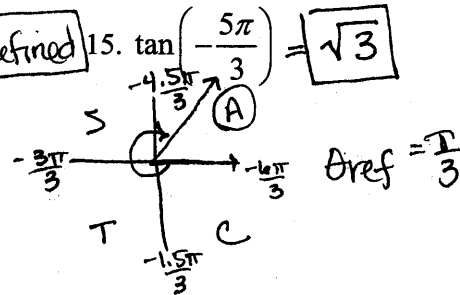
13. $\csc 240^\circ = -\frac{2}{\sqrt{3}}$



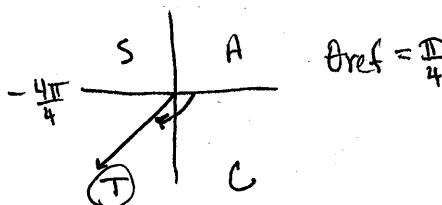
14. $\tan\left(\frac{3\pi}{2}\right) = \frac{y}{x} = \frac{-1}{0} = \text{undefined}$



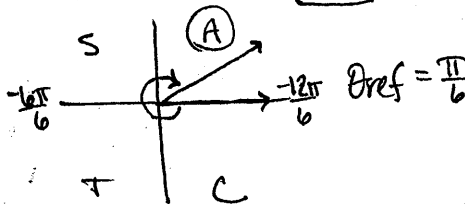
15. $\tan\left(-\frac{5\pi}{3}\right) = \sqrt{3}$



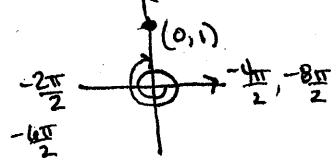
16. $\tan\left(-\frac{3\pi}{4}\right) = 1$



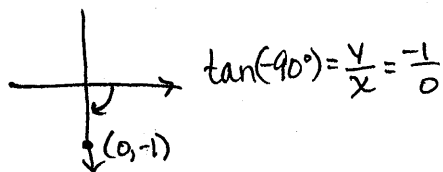
17. $\cos\left(-\frac{11\pi}{6}\right) = \frac{\sqrt{3}}{2}$



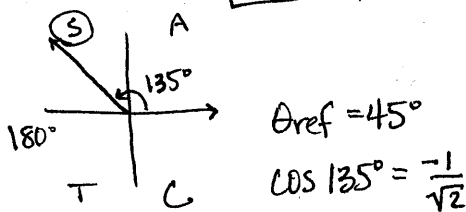
18. $\cos\left(-\frac{7\pi}{2}\right) = 0$



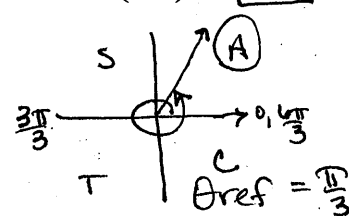
19. $\cot(-90^\circ) = \frac{x}{y} = \frac{0}{-1} = 0$



20. $\sec 135^\circ = -\sqrt{2}$



21. $\sin\left(\frac{7\pi}{3}\right) = \frac{\sqrt{3}}{2}$



Calculator Allowed

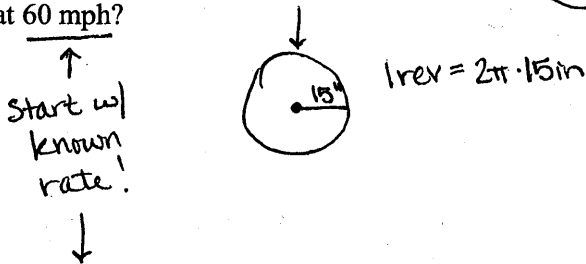
22. Convert from DMS to decimal form: $38^\circ 23' 36''$

38.393°

23. Convert from decimal form to DMS: 59.354°

$59^\circ 21' 14.4''$

24. The radius of a car wheel is 15 inches. How many revolutions per minute is the wheel making when the car is traveling at 60 mph?



$\frac{60 \text{ miles}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{1 \text{ rev}}{2\pi(15) \text{ in}} = \frac{3801600}{1800\pi} = 672.270 \text{ rpm}$

25. A bicyclist's wheel is traveling at 250 revolutions per minute. If the bicycle tire has a diameter of 29 inches, what is the bicyclist's speed in miles per hour? *starts here!*

$$\frac{250 \text{ rev}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{\pi(29 \text{ in})}{1 \text{ rev}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} = \frac{435000\pi}{63360} = \boxed{21.569 \text{ mph}}$$

$1 \text{ rev} = 2\pi(14.5)$
 $1 \text{ rev} = 29\pi \text{ in}$

26. Evaluate: $\sin 47^\circ = .7313537016$
 * degree mode! = $\boxed{.731}$

27. Evaluate: $\csc\left(\frac{\pi}{10}\right) = \frac{1}{\sin\left(\frac{\pi}{10}\right)} = 3.236067977 = \boxed{3.236}$
 * radian mode! $\sin\left(\frac{\pi}{10}\right) = .3090169944$

28. Given: $\theta = -145^\circ$. Change to radian measure in terms of π .

$$\frac{-145^\circ}{180^\circ} \cdot \pi = \boxed{\frac{-29\pi}{36}}$$

29. Given: $\theta = -1$ radian. Change to degree measure.

$$\frac{-1 \text{ radian}}{\pi \text{ radian}} \cdot 180^\circ = \frac{-180^\circ}{\pi} = \boxed{-57.296^\circ}$$

Given the measurement of a central angle, find the measure of its intercepted arc in terms of π in a circle of diameter 30 inches.

30. $\frac{\pi}{24}$
 \uparrow
 θ

$$S = \theta r$$

$$S = \frac{\pi}{24} \cdot 15$$

$$= \boxed{\frac{5\pi}{8} \text{ inches} \approx 1.963 \text{ inches}}$$

31. 110°

$$\frac{110^\circ \pi}{180^\circ} = \frac{11\pi}{18}$$

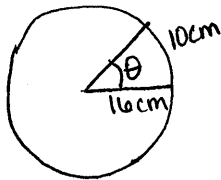
* Need radian angle *

radius = 15 in

$$S = \frac{11\pi}{18} \cdot 15$$

$$S = \boxed{\frac{55\pi}{6} \text{ inches} \approx 28.798 \text{ inch.}}$$

32. The measure of an arc is 10 cm. Find the degree measure to the nearest tenth of the central angle it subtends in a circle of radius 16 cm.



$$S = \theta r$$

$$10 = \theta \cdot 16$$

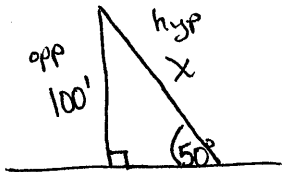
$$\frac{10}{16} = \theta$$

$$\frac{5}{8} \text{ radians} = \theta$$

$$\frac{5 \text{ radians}}{8} \cdot \frac{180^\circ}{\pi \text{ radians}} = \left(\frac{225}{2\pi}\right)^\circ$$

$$\approx \boxed{35.810^\circ}$$

33. A cable from the top of a 100 ft cell phone tower makes a 50° angle with the ground. How long is the cable? *Degree Mode!*



$$\sin 50^\circ = \frac{100}{x}$$

$$x \cdot \sin 50^\circ = 100$$

$$x = \frac{100}{\sin 50^\circ}$$

$$\boxed{x = 130.541 \text{ ft}}$$

34. To measure the width of a river, a surveyor starts at point A on one bank and walks 75 feet down the river to point B. She then measures the angle ABC to be $21^\circ 37' 15''$. Find the width of the river to the nearest foot.

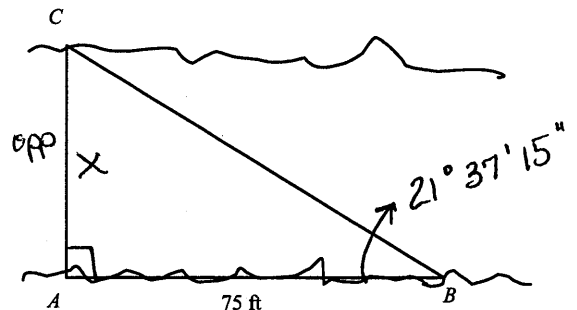
$$\tan(21^\circ 37' 15'') = \frac{x}{75}$$

$$75 \tan(21^\circ 37' 15'') = x$$

\uparrow
 If you convert this to a decimal... DO NOT ROUND *adj*

$$75 \tan(21.6208\bar{3}) = x$$

$$\boxed{29.726 \text{ feet} = x}$$



* For Questions 24, 25, 29 → 34... be sure to put appropriate units on your answers*