2) $\cot 160^\circ = \frac{1}{\tan 160^\circ} = -2.75$

make sure calc is in the right mode

3) e) $\cos\theta < 0$ and $\csc\theta > 0$

$x < 0$

QII and QIII

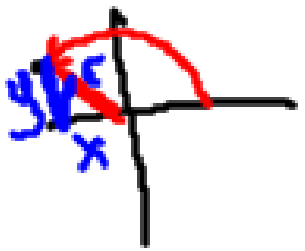
$\frac{1}{\sin\theta} > 0$

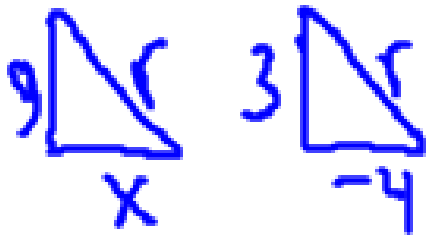
$\frac{1}{y} > 0$

QI and QII

QII

Point $(-4, 3)$ in standard position. Find exact values of each trig ratio.





** doesn't say unit circle so we can't assume radius = 1

$\sin\theta = \frac{3}{5}$

$\cos\theta = \frac{-4}{5}$

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

$\csc\theta = \frac{5}{3}$

$\sec\theta = -5/4$

$\cot\theta = -4/3$

$3^2 + (-4)^2 = r^2$

$9 + 16 = r^2$

$25 = r^2$

$\pm\sqrt{25} = r$

$\boxed{5 = r}$ ** terminal arm is always positive.

Simplifying Trig EXPRESSIONS

$\sin^2\theta = (\sin\theta)(\sin\theta)$

$$\frac{1}{\sin\left(-\frac{2\pi}{3}\right)+\cos^2\left(\frac{11\pi}{6}\right)}$$

coterminal with $-\frac{2\pi}{3}+\frac{6\pi}{3}=\frac{4\pi}{3}$

$$\frac{1}{-\frac{\sqrt{3}}{2}+\left(\frac{\sqrt{3}}{2}\right)^2} = \frac{1}{-\frac{\sqrt{3}}{2}+\frac{3}{4}} = \frac{1}{-\frac{2\sqrt{3}}{4}+\frac{3}{4}} = \frac{1}{\frac{-2\sqrt{3}+3}{4}} = \frac{4}{-2\sqrt{3}+3}$$

$$\frac{4}{-2\sqrt{3}+3}\cdot\frac{-2\sqrt{3}-3}{-2\sqrt{3}-3} = \frac{-8\sqrt{3}-12}{4(3)-9} = \boxed{\frac{-8\sqrt{3}-12}{3}}$$

$$\frac{\cot(-60^\circ)\cos(300^\circ)}{\csc(-240^\circ)}$$

$$\frac{\cot(300^\circ)\cos(300^\circ)}{\csc(120^\circ)}$$

$$\frac{\frac{1}{\tan(300^\circ)}\cdot\cos(300^\circ)}{\frac{1}{\sin(120^\circ)}}$$

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

$$-\frac{\sqrt{3}}{2}\div\frac{2}{\sqrt{3}}$$

$$-\frac{\sqrt{3}}{2}\cdot\frac{\sqrt{3}}{2}$$

$$-\frac{3}{4}$$

Finding Angles Given Their Trigonometric Ratios

$\sin\theta = +$

A) $\sin\theta = 0.654$, $0 \le \theta < 2\pi$ → tells you what mode to put calc in

$\theta = \sin^{-1}(0.654)$

$\theta = 0.71$ ✓

Where is $\sin\theta +$? Q1 and 2

0.71 is in Q1

Q2: $\pi - 0.71 = 2.44$ ✓

$\theta = \{0.71, 2.44\}$

B) $\tan\theta = -1.235$, $-180° \le \theta < 180°$

calc in degree mode

$\theta = \tan^{-1}(-1.235)$

$\theta \approx -51°$ ✓

Q4

where is $\tan\theta = -$? Q4 and Q2

Ref angle in Q2 $\quad 180° - 51° = 129°$ ✓

$$\theta = \{-51°, 129°\}$$

C) $\csc\theta = \frac{2}{\sqrt{3}}$, $-2\pi \le \theta < 2\pi$

$\frac{1}{\sin\theta} = \frac{2}{\sqrt{3}}$

$\sin\theta = \frac{\sqrt{3}}{2}$

$\theta = \frac{\pi}{3}$ ✓ and $\frac{2\pi}{3}$ ✓ } only b/n 0 and 2π

I need b/n -2π and 2π

coterminal: $\frac{\pi}{3} - \frac{6\pi}{3} = -\frac{5\pi}{3}$ ✓ $\quad \frac{2\pi}{3} - \frac{6\pi}{3} = -\frac{4\pi}{3}$ ✓

$\theta = \{-\frac{5\pi}{3}, -\frac{4\pi}{3}, \frac{\pi}{3}, \frac{2\pi}{3}\}$

5. For each point, sketch two coterminal angles in standard position whose terminal arm contains the point. Give one positive and one negative angle, in radians, where neither angle exceeds one full rotation.

a) $(3, 5)$

b) $(-2, -1)$

c) $(-3, 2)$

d) $(5, -2)$

12. Determine the exact values of the other five trigonometric ratios under the given conditions.

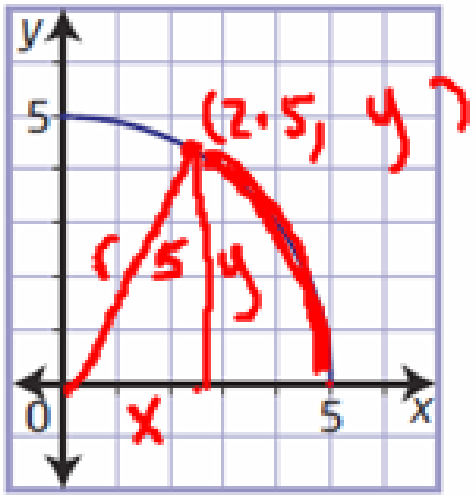
a) $\sin\theta = \frac{3}{5}, \frac{\pi}{2} < \theta < \pi$

b) $\cos\theta = \frac{-2\sqrt{2}}{3}, -\pi \leq \theta \leq \frac{3\pi}{2}$

c) $\tan\theta = \frac{2}{3}, -360^\circ < \theta < 180^\circ$

d) $\sec\theta = \frac{4\sqrt{3}}{3}, -180^\circ \leq \theta \leq 180^\circ$

21. The diagram shows a quarter-circle of radius 5 units. Consider the point on the curve where $x = 2.5$. Show that this point is one-third the distance between (0, 5) and (5, 0) on the arc of the circle.



Q1

$\cos\theta = \frac{x}{r}$

$\cos\theta = \frac{2.5}{5}$

$\cos\theta = \frac{1}{2}$

$\theta = \frac{\pi}{3}$

Part arc

$a = \theta r$

$a = \left(\frac{\pi}{3}\right)(5)$

$a = \frac{5\pi}{3}$ ✓

Big Arc

$a = \theta r$

$a = \left(\frac{\pi}{2}\right)5$

$a = \frac{5\pi}{2}$

$\frac{5\pi}{2} \cdot \frac{2}{3} = \frac{10\pi}{6} = \frac{5\pi}{3}$ ✓

HW: pg 202 #9, 10, 13,14,17,18,19, C4