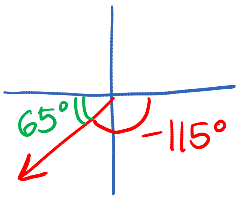
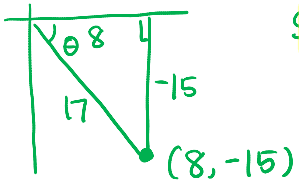
13.3-13.4 Practice Quiz #1 **Name:** Key

1. Sketch the angle $-115°$. Then find its reference angle.



180
-115
65°

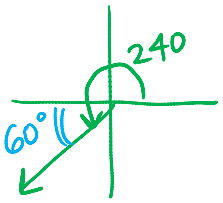
2. Use the point $(8,-15)$ on the terminal side of an angle θ in standard position to evaluate the six trigonometric functions of θ.



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

3. Evaluate the function $\sin 240°$ without using a calculator.

$\sin = y = -\frac{\sqrt{3}}{2}$



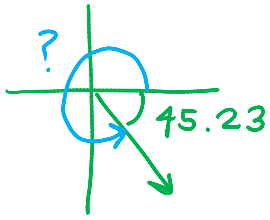
240
-180
60° $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ BUT
3rd Quad ⇒ x & y are negative $(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$

4. Evaluate the expression $\cos^{-1}(-1)$ without using a calculator. Give your answer in radians and degrees.

$\cos\theta = -1$
what angle has a cos value (or x-value) of -1?
π or 180°

5. Solve the equation for θ: $\sin\theta = -0.71; 270° < \theta < 360°$

$\theta = \sin^{-1}(-0.71) = -45.23°$



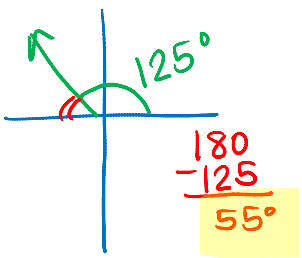
360
-45.23
314.77°

check! $\sin(314.77) \stackrel{?}{\doteq} -0.71$ ✓

#1: Reference Angle Review

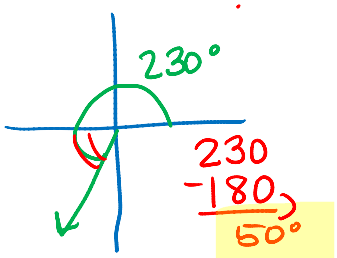
Sketch the angle. Then find its reference angle.

1. 125°



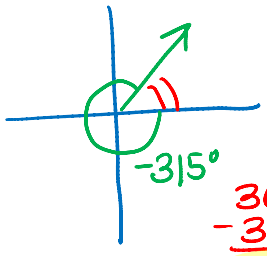
180
-125
55°

2. 230°



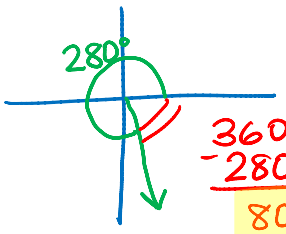
230
-180
50°

3. −315°



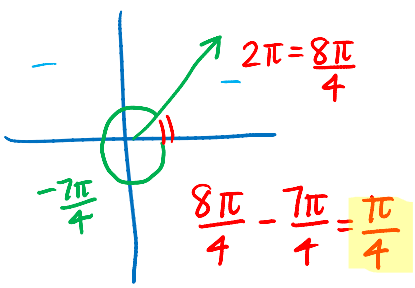
360
-315
45°

4. 280°



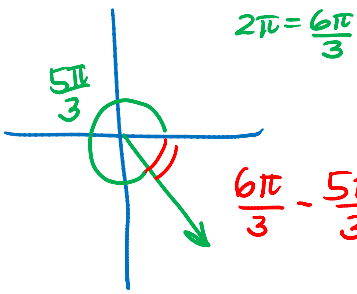
360
-280
80°

5. $-\frac{7\pi}{4}$



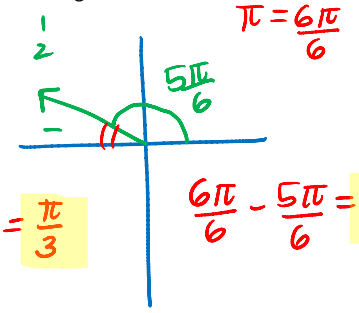
$\frac{8\pi}{4} - \frac{7\pi}{4} = \frac{\pi}{4}$

6. $\frac{11\pi}{3} - \frac{6\pi}{3} = \frac{5\pi}{3}$



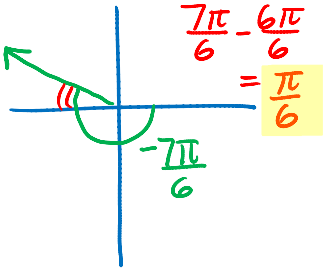
$\frac{6\pi}{3} - \frac{5\pi}{3} = \frac{\pi}{3}$

7. $\frac{5\pi}{6}$



$\frac{6\pi}{6} - \frac{5\pi}{6} = \frac{\pi}{6}$

8. $-\frac{7\pi}{6}$

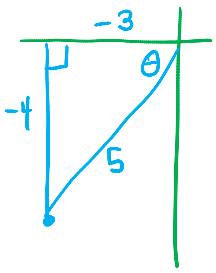


*always draw vertical lines (not horizontal to make your △)
**NO RADICALS IN THE DENOMINATOR

#2: Evaluating Trig Functions from a Given Point

Use the given point on the terminal side of an angle θ in standard position to evaluate the six trigonometric functions of θ.

1. $(-3,-4)$

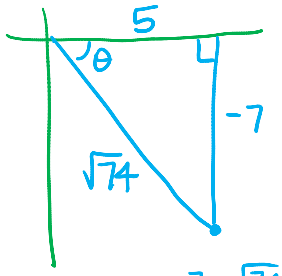


$\sin\theta = -\frac{4}{5}$ $\quad \csc\theta = -\frac{5}{4}$

$\cos\theta = -\frac{3}{5}$ $\quad \sec\theta = -\frac{5}{3}$

$\tan\theta = \frac{4}{3}$ $\quad \cot\theta = \frac{3}{4}$

2. $(5,-7)$



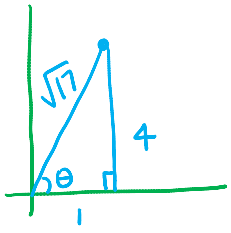
$\sin\theta = -\frac{7\sqrt{74}}{74}$ $\quad \csc\theta = -\frac{\sqrt{74}}{7}$

$\cos\theta = \frac{5\sqrt{74}}{74}$ $\quad \sec\theta = \frac{\sqrt{74}}{5}$

$\tan\theta = -\frac{7}{5}$ $\quad \cot\theta = -\frac{5}{7}$

$\sin = -\frac{7}{\sqrt{74}} \cdot \frac{\sqrt{74}}{\sqrt{74}} = -\frac{7\sqrt{74}}{74}$

3. $(1,4)$

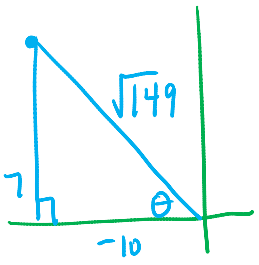


$\sin\theta = \frac{4\sqrt{17}}{17}$ $\quad \csc\theta = \frac{\sqrt{17}}{4}$

$\cos\theta = \frac{\sqrt{17}}{17}$ $\quad \sec\theta = \sqrt{17}$

$\tan\theta = 4$ $\quad \cot\theta = \frac{1}{4}$

4. $(-10,7)$



$\sin\theta = \frac{7\sqrt{149}}{149}$ $\quad \csc\theta = \frac{\sqrt{149}}{7}$

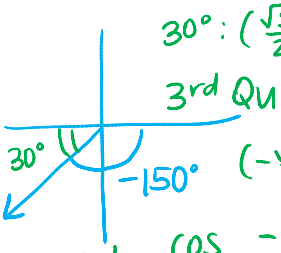
$\cos\theta = -\frac{10\sqrt{149}}{149}$ $\quad \sec\theta = \frac{\sqrt{149}}{10}$

$\tan\theta = -\frac{7}{10}$ $\quad \cot\theta = -\frac{10}{7}$

#3: Evaluating Trig Functions Review

Evaluate the function without using a calculator.

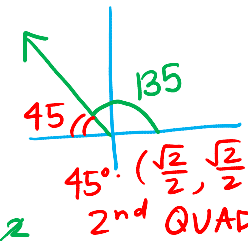
1. $\cot(-150°)$



30°: $(\frac{\sqrt{3}}{2}, \frac{1}{2})$
3rd QUAD!
$(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$

$\cot = \frac{\cos}{\sin} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \frac{-\sqrt{3}}{2} \cdot \frac{-2}{1} = \sqrt{3}$

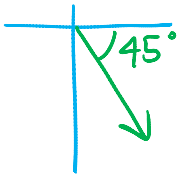
2. $\sin(135°)$



45°: $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
2nd QUAD ⇒ $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

$\sin = y = \frac{\sqrt{2}}{2}$

3. $\sec(-45°)$



45: $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
4th QUAD →
$(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$

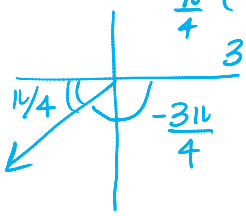
$\sec = \frac{1}{\cos} = \frac{1}{\frac{\sqrt{2}}{2}} = 1 \cdot \frac{2}{\sqrt{2}} = \frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

4. $\tan(225°)$

3rd Quad
$(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$

$\tan = \frac{\sin}{\cos} = \frac{-\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = 1$

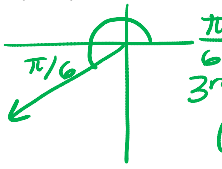
5. $\cos\left(-\frac{3\pi}{4}\right)$



$\frac{11\pi}{4}$ $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
3rd Quad
$(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$

$\cos = x = -\frac{\sqrt{2}}{2}$

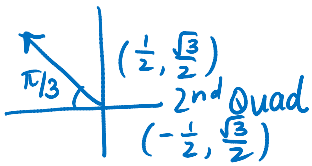
6. $\csc\left(\frac{7\pi}{6}\right)$



$\frac{\pi}{6} \cdot (\frac{\sqrt{3}}{2}, -)$
3rd Quad ⇒
$(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$

$\csc = \frac{1}{\sin} = \frac{1}{-\frac{1}{2}} = 1 \cdot \frac{-2}{1} = -2$

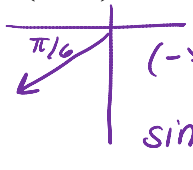
7. $\tan\left(\frac{8\pi}{3}\right) = \frac{2\pi}{3}$



$(\frac{1}{2}, \frac{\sqrt{3}}{2})$
2nd Quad
$(-\frac{1}{2}, \frac{\sqrt{3}}{2})$

$\tan = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{-2}{1} = -\sqrt{3}$

8. $\sin\left(-\frac{5\pi}{6}\right)$



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

$\sin = y = -\frac{1}{2}$

#4: Inverse Trig Functions Review

Evaluate the expression without using a calculator. Give your answer in both radians and degrees.

* remember domain restrictions

SIN & TAN: $-90° < \theta < 90°$ COS: $0 < \theta < 180°$

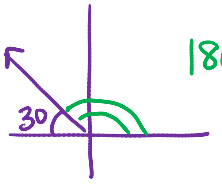
1. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ which angle has a sin (or y-value) of $\frac{\sqrt{3}}{2}$?

$60°$ or $\frac{\pi}{3}$

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

$-45°$ or $-\frac{\pi}{4}$

3. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ $30° = \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$



$180 - 30 = 150°$ or $\frac{5\pi}{6}$

4. $\tan^{-1}\left(\sqrt{3}\right)$

$60°$ or $\frac{\pi}{3}$

5. $\cos^{-1}(2)$ * unit circle has no coordinates larger than 1

undefined

6. $\tan^{-1}(1)$

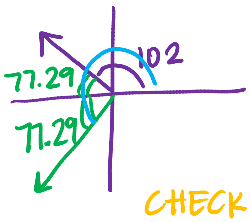
$45°$ or $\frac{\pi}{4}$

#5: Solving Trig Equations over a Given Interval

Solve the equation for θ.

1. $\cos\theta = -0.22; 180° < \theta < 270°$ ⇒ 3rd QUAD

$\theta = \cos^{-1}(-0.22) \approx 102.71$

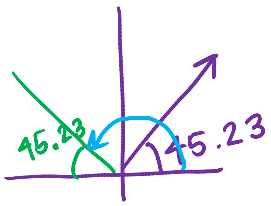


$180 + 77.29 = 257.29°$

CHECK: $\cos(257.29) \stackrel{?}{=} -.22$ ✓

2. $\sin\theta = 0.71; 90° < \theta < 180°$ ⇒ 2nd QUAD

$\theta = \sin^{-1}(0.71) \approx 45.23$

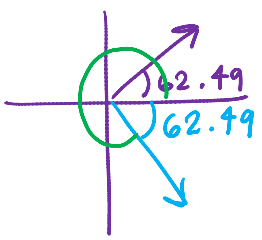


$180 - 45.23 = 134.77°$

CHECK: $\sin(134.77) = 0.71$ ✓

3. $\tan\theta = 1.92; 270° < \theta < 360°$ ⇒ 4th QUAD

$\theta = \tan^{-1}(1.92) \approx 62.49$



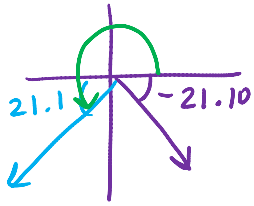
$360 - 62.49 = 297.51°$

CHECK: $\tan 297.51 \stackrel{?}{=}$ ~~-1.92~~

tan in 4th Quad should be negative ⇒ this ✗ is undefined!

4. $\sin\theta = -0.36; 180° < \theta < 270°$ ⇒ 3rd Quad

$\theta = \sin^{-1}(-0.36) \approx -21.10$



$180 + 21.10 = 201.10°$

CHECK: $\sin 201.10 = -0.36$ ✓