Openers #6

Name: **Key**

Each day when you come into class, there will be a problem projected for you to complete. Find the appropriate box to complete the problem in and work on it when you arrive.

Date:	6-1
___ / ___ / ___	Find a positive and negative angle coterminal to -150°.

Sample: $210°, 570°, -510°, -870°$

Find an angle complementary to 63°4'15".

$$90 - 63°4'15'' = 26°55'45''$$

Find the exact radian measure of 630°.

$$630 \cdot \frac{\pi}{180} = \frac{7\pi}{2}$$

Find the exact degree measure of $\frac{11\pi}{4}$.
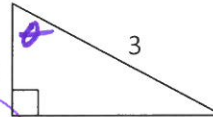
$$\frac{11\pi}{4} \cdot \frac{180}{\pi} = 495°$$

Express θ=4 in terms of degrees, minutes and seconds.

$$4^R \cdot \frac{180}{\pi} = 229.1831181 \quad DMS \Rightarrow 229°10'59''$$
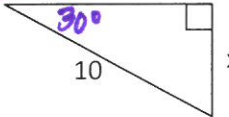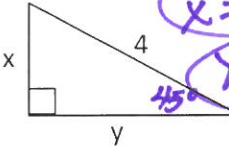
Date:	6-2-1
___ / ___ / ___	

Find the values of the six trig functions for θ.

$1^2 + b^2 = 3^2$
$b = \sqrt{8}$

$$\frac{\sqrt{8}}{3}, \frac{1}{3}, \sqrt{8}, \frac{3}{\sqrt{8}}, 3, \frac{1}{\sqrt{8}}$$

Find the exact values of x and y.

$x = 5$
$y = 5\sqrt{3}$

$x = 2\sqrt{2}$
$y = 2\sqrt{2}$

Use Pythagorean identities to write $5\sin^2\theta + 5\cos^2\theta$ as an integer.

$$5(\sin^2\theta + \cos^2\theta)$$
$$5(1) = 5$$

Simplify. $\frac{\cot^2\theta - 4}{\cot^2\theta - \cot\theta - 6}$

$$\frac{(\cot\theta - 2)(\cot\theta + 2)}{(\cot\theta - 3)(\cot\theta + 2)} = \frac{\cot\theta - 2}{\cot\theta - 3}$$

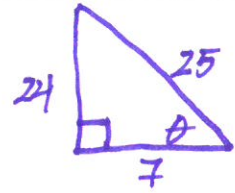Verify the identity. $\cot\theta\sec\theta = \csc\theta$

$$\frac{\cos\theta}{\sin\theta} \cdot \frac{1}{\cos\theta} =$$

$$\frac{1}{\sin\theta} =$$

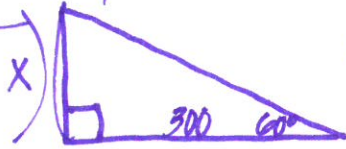$$\csc\theta = \csc\theta$$

Date:	6-2-2

___/___/___

Find the exact values of the trig functions for $\cot\theta = \frac{7}{24}$.

$$\frac{24}{25}, \frac{7}{25}, \frac{24}{7}, \frac{25}{24}, \frac{25}{7}, \frac{7}{24}$$

A forester, 300 feet from the base of a tree, observes the angle between the ground and top of the tree is 60°. Estimate the height of the tree.
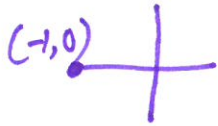

$$300\sqrt{3}\ ft \approx 519.62\ ft.$$

Verify the identity. $(\tan\theta + \cot\theta)\tan\theta = \sec^2\theta$

$$\tan^2\theta + \cot\theta\ \tan\theta =$$
$$\tan^2\theta + 1 =$$
$$\sec^2\theta = \sec^2\theta$$

$\tan\cdot\frac{1}{\tan} = 1$

Find the exact values of the six trig functions of each angle.

a) 180°

$(-1,0)$

$$0, -1, 0, u, -1, u$$

b) $\frac{5\pi}{2}$

(0,1)
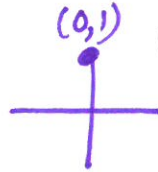
$$1, 0, u, 1, u, 0$$

Find the quadrant containing θ if

a) $\tan\theta < 0$ and $\cos\theta > 0$
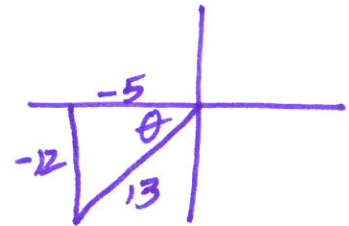
QIV

b) $\csc\theta > 0$ and $\cot\theta < 0$

QII

Date:	6-3

___/___/___
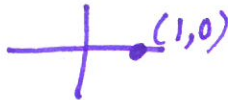
Find the values of the six trig functions of $P(\frac{-5}{13}, \frac{-12}{13})$.

$$\frac{-12}{13}, \frac{-5}{13}, \frac{12}{5}, \frac{-13}{12}, \frac{-13}{5}, \frac{5}{12}$$

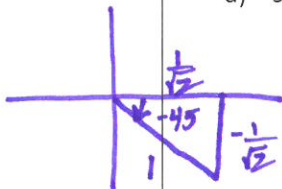Find the coordinates of P on the unit circle and the exact values of the six trig functions of 6π.
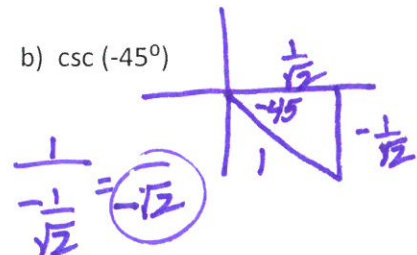
 (1,0)

$$0, 1, 0, u, 1, u$$

Find the exact value of

a) $\sec(\frac{-\pi}{4})$

$$-\frac{\pi}{4} \cdot \frac{180}{\pi} = -45°$$

$$\frac{1}{\frac{1}{\sqrt{2}}} = \sqrt{2}$$

b) $\csc(-45°)$

$$\frac{1}{-\frac{1}{\sqrt{2}}} = -\sqrt{2}$$

Verify the identity. $\cot(-x)\cos(-x) + \sin(-x) = -\csc x$

$$(-\cot x)(\cos x) - (\sin x) =$$
$$-\left(\frac{\cos x}{\sin x}\right)(\cos x) - (\sin x)$$
$$-\frac{\cos^2 x}{\sin x} - \frac{\sin^2 x}{\sin x} = \frac{-(\cos^2 x + \sin^2 x)}{\sin x} = \frac{-(1)}{\sin x} = -\csc x = -\csc x$$

Date: ___/___/___	**6-4**

Find the reference angle if θ has the given measure

a) $-110°$
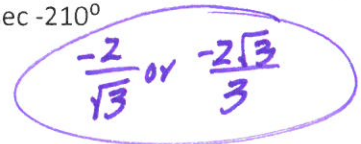
$70°$

b) $\frac{7\pi}{4} \cdot \frac{180}{\pi} = 315°$

$\frac{\pi}{4}$

$\frac{5\pi}{4} \cdot \frac{180}{\pi} = 225°$

Find the exact value of

a) $\cos\left(\frac{5\pi}{4}\right)$

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

b) $\sec -210°$

$\frac{-2}{\sqrt{3}}$ or $\frac{-2\sqrt{3}}{3}$
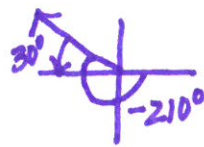
Approximate the acute angle θ to the nearest 1'. $\cos\theta = .8$

$\cos^{-1}(.8) = 36.8698° \Rightarrow DMS$

$36°52'$

Approximate to four decimal places. $\cot 1030.2°$

$\frac{1}{\tan 1030.2} \approx -.8451$

Approximate to the nearest .1° all angles θ in the interval $[0°, 360°)$ that satisfies

a) $\sin\theta = .8825$

$\sin^{-1}(.8825) = 61.9°$

Since Sin + in QI & QII

$180 - 61.9 = 118.1°$

b) $\sec\theta = 1.4291$

$\cos^{-1}\left(\frac{1}{1.4291}\right) = 45.6°$

Since Cos + in QI & QIV

$360 - 45.6 = 314.4°$

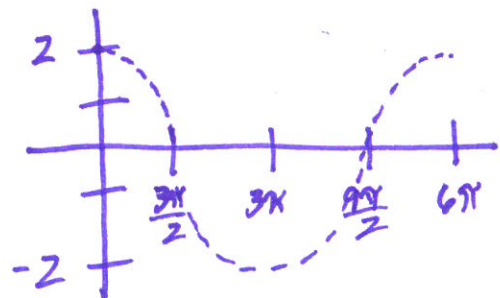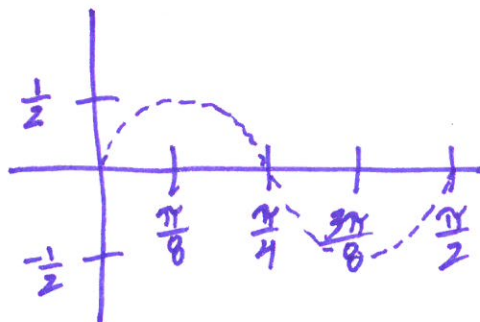|	
Date: ___/___/___	**6-5**

Find the amplitude and period and sketch the graphs.

a) $y = \frac{1}{2}\sin 4x$

amp: $\frac{1}{2}$

per: $\frac{\pi}{2}$

b) $y = 2\cos\frac{1}{3}x$
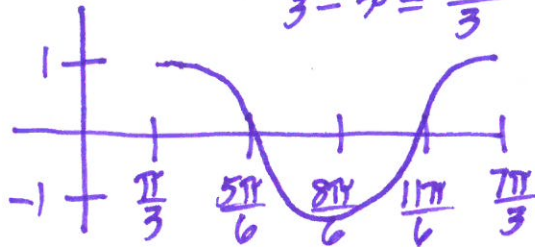

amp: 2

per: 6π

6-5 continued...

Find the amplitude, period and phase shift and sketch the graphs.

a) $y = \cos\left(x - \frac{\pi}{3}\right)$ $0 \le x - \frac{\pi}{3} \le 2\pi$

$\frac{\pi}{3} \le x \le \frac{7\pi}{3}$

amp: 1

per: 2π

P.S. $\frac{\pi}{3}$

-1 $\frac{\pi}{3}$ $\frac{5\pi}{6}$ $\frac{8\pi}{6}$ $\frac{11\pi}{6}$ $\frac{7\pi}{3}$

b) $y = \sin\left(\frac{1}{2}x + \frac{\pi}{4}\right)$ $0 \le \frac{1}{2}x + \frac{\pi}{4} \le 2\pi$

$-\frac{\pi}{2} \le x \le \frac{7\pi}{2}$

amp: 1

per: 4π

P.S. $-\frac{\pi}{2}$
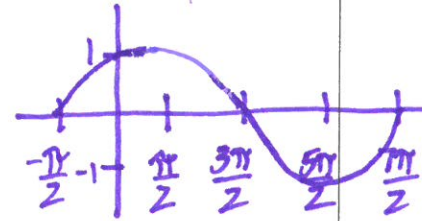
$-\frac{\pi}{2}$ -1 $\frac{\pi}{2}$ $\frac{3\pi}{2}$ $\frac{5\pi}{2}$ $\frac{7\pi}{2}$

6-6

Find the period and sketch the graphs. Show asymptotes.

amp: $\frac{1}{2}$

per: 2π

a) $y = \frac{1}{2}\csc x$

$\frac{1}{2}$

$-\frac{1}{2}$ $\frac{\pi}{2}$ π $\frac{3\pi}{2}$ 2π

per: π

P.S. $-\frac{3\pi}{4}$

$-\frac{\pi}{2} < x + \frac{3\pi}{4} < \frac{\pi}{2} \rightarrow -\frac{5\pi}{4} < x < -\frac{\pi}{4}$

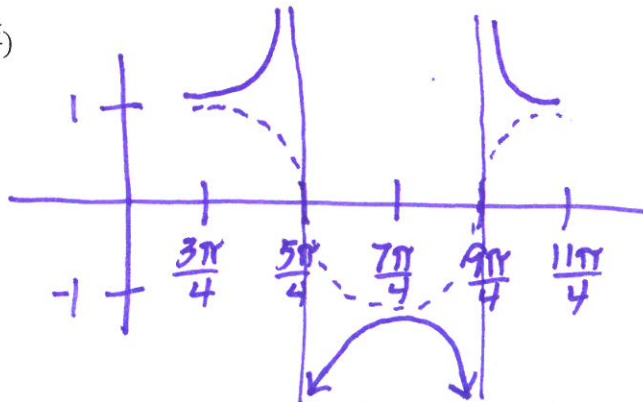b) $y = \tan\left(x + \frac{3\pi}{4}\right)$

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

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

per: $\frac{\pi}{3}$

c) $y = \cot 3x$

$\frac{\pi}{6}$

$\frac{\pi}{3}$

per: 2π

$0 < x - \frac{3}{4} < 2\pi$

$\frac{3\pi}{4} < x < \frac{11\pi}{4}$

d) $y = \sec\left(x - \frac{3\pi}{4}\right)$

P.S. $\frac{3\pi}{4}$

1
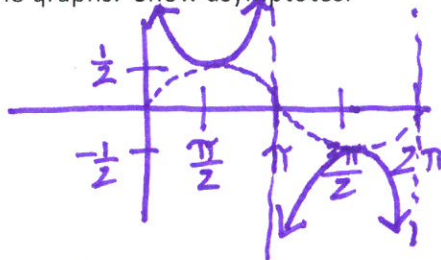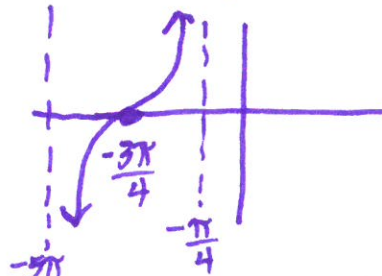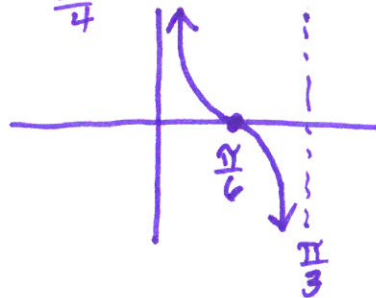
-1 $\frac{3\pi}{4}$ $\frac{5\pi}{4}$ $\frac{7\pi}{4}$ $\frac{9\pi}{4}$ $\frac{11\pi}{4}$

Given the indicated parts of the triangle ABC with γ = 90°, find the exact values of the remaining parts.

1. α = 60°, c = 6

A
60°
b
3
c
6
C
α 3√3
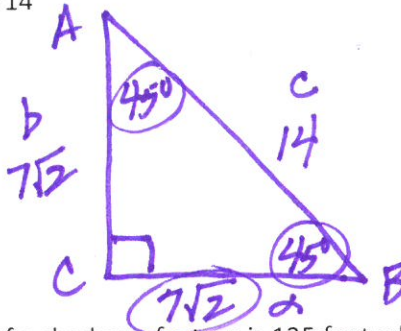30°
B

$\beta = 30°$

$b = 3$

$\alpha = 3\sqrt{3}$

2. b = 7√2, c = 14

A
45°
b
7√2
c
14
C
7√2 α
45°
B

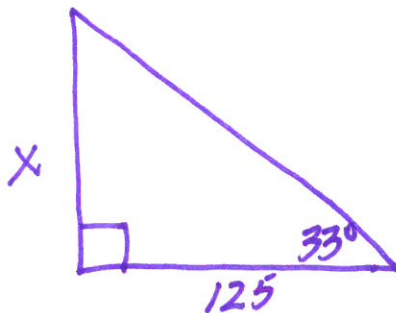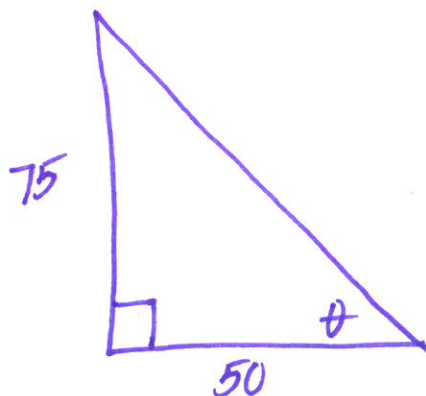$\alpha = 45°$

$\beta = 45°$
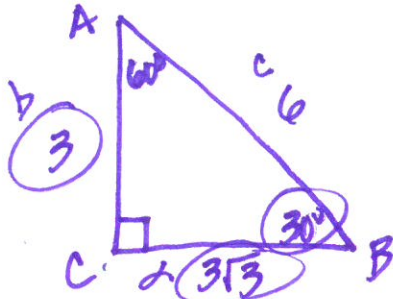
$\alpha = 7\sqrt{2}$

3. The length of a shadow of a tree is 125 feet when the angle of elevation of the sun is 33°. Approximate the height of the tree.

x
33°
125

$\tan 33 = \dfrac{x}{125}$

$x = 81.2 \, ft$

4. An amateur radio operator erects a 75-foot vertical tower for an antenna. Find the angle of elevation to the top of the tower at a point on level ground 50 feet from its base.

75
θ
50

$\theta = \tan^{-1}\left(\dfrac{75}{50}\right)$

$\theta \approx 56.3°$