Name: _____ _Key_ _.
Period: _____

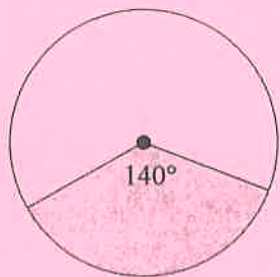**No Calculators!!**

1. If the arc length of the sector is $\dfrac{28\pi}{3}$ ft, find the radius of the circle.
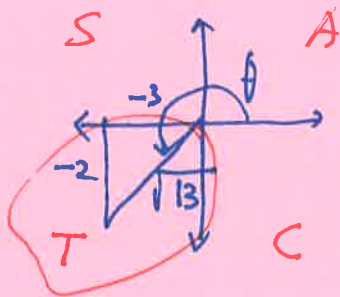

$140°: x$
$180°: \pi$

$\ell = (r)\left(\dfrac{7\pi}{9}\right) = \dfrac{28\pi}{3}$

$x = \dfrac{140\pi}{180} = \dfrac{7\pi}{9}$

$r = \left(\dfrac{28\pi}{3}\right)\left(\dfrac{9}{7\pi}\right) = \boxed{12 \text{ ft.}}$

2. If the coordinate $(-3, -2)$ is on the terminal side of an angle, θ, in standard position, find the values of all 6 trig functions.

$\sin\theta = \dfrac{-2}{\sqrt{13}} = \dfrac{-2\sqrt{13}}{13}$ $\csc\theta = \dfrac{-\sqrt{13}}{2}$

$\cos\theta = \dfrac{-3}{\sqrt{13}} = \dfrac{-3\sqrt{13}}{13}$ $\sec\theta = -\dfrac{\sqrt{13}}{3}$
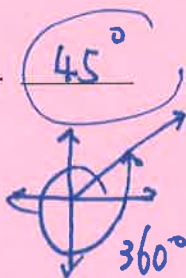
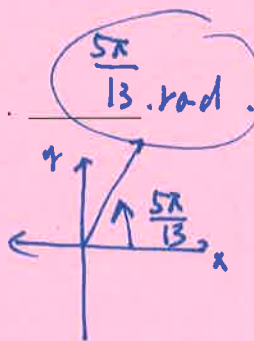$\tan\theta = \dfrac{2}{3}$ $\cot\theta = \dfrac{3}{2}$

3. Find the reference angle.

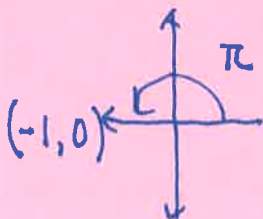a. $-\dfrac{7\pi}{6}$ $\dfrac{\pi}{6}$ rad

$-\dfrac{7\pi}{6} = \dfrac{-6\pi}{6} - \dfrac{\pi}{6}$

b. $405°$ $45°$

$405 - 360° = 45°$

c. $\dfrac{5\pi}{13}$ $\dfrac{5\pi}{13}$ rad
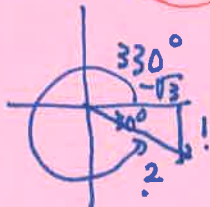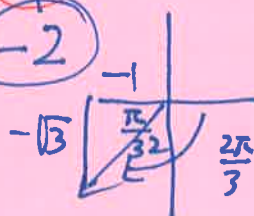
6. Find the exact value.

a. $\tan\pi = \dfrac{\sin\pi}{\cos\pi} = \dfrac{0}{-1} = \boxed{0}$

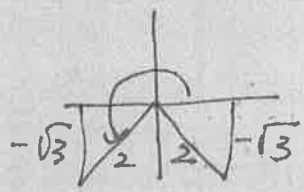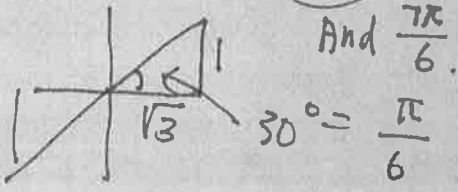b. $\csc 330° = -\dfrac{2}{\sqrt{3}}$ OR $= -\dfrac{2\sqrt{3}}{3}$

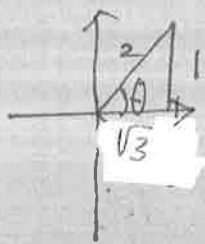c. $\cos\left(-\dfrac{2\pi}{3}\right)$ $\dfrac{-1}{2}$

7. Find all values of θ in the domain $(0, 2\pi]$.

a. $\cot\theta = \sqrt{3} \Rightarrow \boxed{\dfrac{\pi}{6} = \theta}$

And $\dfrac{7\pi}{6}$.

$30° = \dfrac{\pi}{6}$

b. $\sec\theta = 1 \Rightarrow \boxed{\theta = 2\pi \text{ rad}}$

$\dfrac{1}{\cos\theta} = 1 \Rightarrow \cos\theta = 1$

c. $\sin\theta = -\dfrac{\sqrt{3}}{2} \Rightarrow \theta = \dfrac{4\pi}{3}, \dfrac{5\pi}{3}$

$\theta_{ref} = \dfrac{\pi}{3}$

8. Find the exact values of the six trigonometric functions of an angle θ if $\sin\theta = \dfrac{1}{2}$, $\cos\theta > 0$ are true.

$\sin\theta = \dfrac{1}{2}$ $\csc\theta = 2$

$\cos\theta = \dfrac{\sqrt{3}}{2}$ $\sec\theta = \dfrac{2}{\sqrt{3}} = \dfrac{2\sqrt{3}}{3}$

$\tan\theta = \dfrac{1}{\sqrt{3}} = \dfrac{\sqrt{3}}{3}$ $\cot\theta = \sqrt{3}$

9. Complete the unit circle attached (write in all the angles in radians)