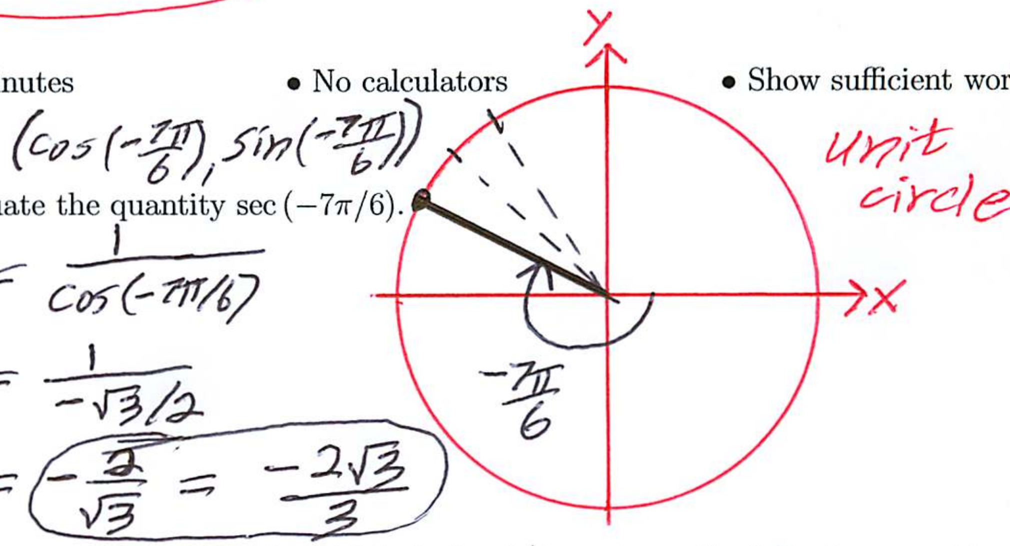
Name solutions

- You have 15 minutes
- No calculators
- Show sufficient work

1. (1 point) Evaluate the quantity $\sec(-7\pi/6)$.

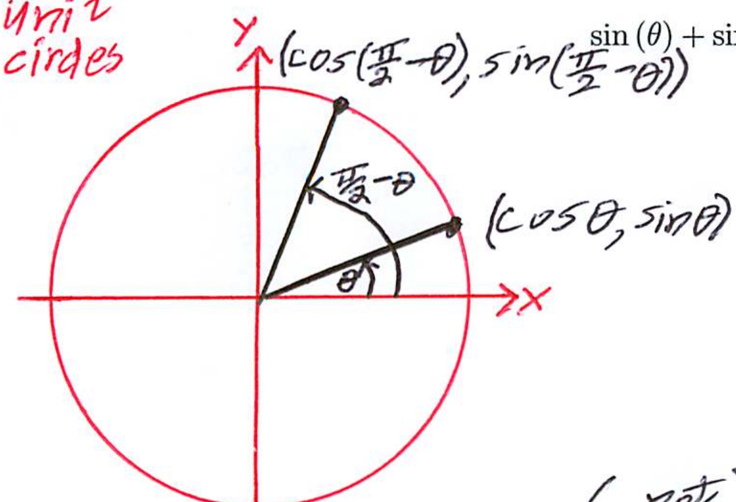


$$\sec\left(-\frac{7\pi}{6}\right) = \frac{1}{\cos(-7\pi/6)} = \frac{1}{-\sqrt{3}/2} = -\frac{2}{\sqrt{3}} = \frac{-2\sqrt{3}}{3}$$

2. (3 points) Given an acute angle θ for which $\sin\theta = 3/5$, evaluate the following quantity.

$$\sin(\theta) + \sin\left(\frac{\pi}{2} - \theta\right) + \sin(\pi - \theta)$$

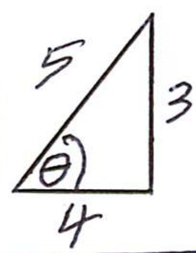
unit circles



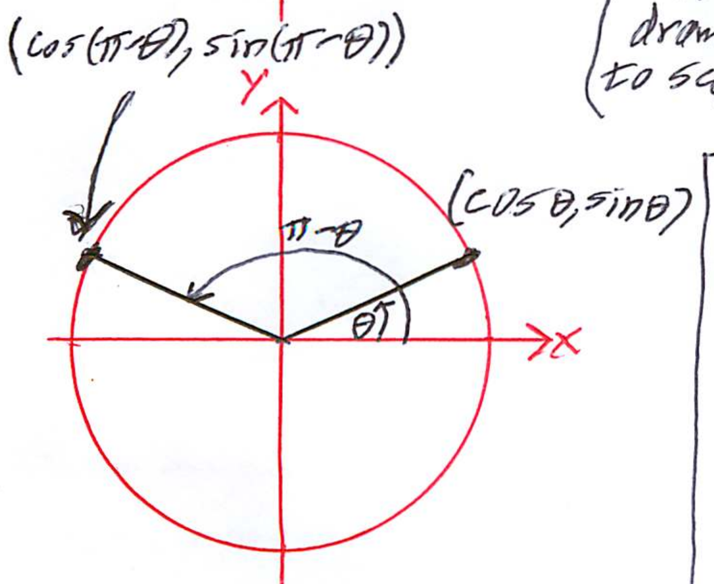
$\sin\left(\frac{\pi}{2}-\theta\right) = \cos(\theta)$

$\sin(\pi-\theta) = \sin(\theta)$

(not drawn to scale)



θ acute, $\sin\theta = \frac{3}{5}$ $\Rightarrow$ $\cos\theta = 4/5$



$\sin(\theta) + \sin\left(\frac{\pi}{2}-\theta\right) + \sin(\pi-\theta) =$

$\sin(\theta) + \cos(\theta) + \sin(\theta) =$

$\frac{3}{5} + \frac{4}{5} + \frac{3}{5} =$

$\frac{10}{5} = 2$

3. (3 points) Suppose that $f(x)$ is an odd function, $g(x)$ is an even function, $f(5) = 3$ and $g(4) = -5$. What is the value of $(f \circ g)(-4)$.

f odd $\Rightarrow f(-x) = -f(x)$

g even $\Rightarrow g(-x) = g(x)$

$(f \circ g)(-4) = f(g(-4)) = f(g(4))$ since g even

$= f(-5)$

$= -f(5)$ since f odd

$= -3$

4. (3 points) Determine the domain of the given function.

$$f(x) = \frac{x^2 - 1}{3\sqrt{2} - \sqrt{50 - 2x^2}}$$

do not take square root of negative number

$50 - 2x^2 \geq 0 \Rightarrow -2x^2 \geq -50$

$\Rightarrow x^2 \leq 25$

$\Rightarrow \sqrt{x^2} \leq \sqrt{25}$

$\Rightarrow |x| \leq 5$

$\Rightarrow -5 \leq x \leq 5$

do not divide by 0

denominator equals 0 when

$3\sqrt{2} - \sqrt{50 - 2x^2} = 0 \Rightarrow 3\sqrt{2} = \sqrt{50 - 2x^2}$

$\Rightarrow (3\sqrt{2})^2 = (\sqrt{50 - 2x^2})^2$

$\Rightarrow 18 = 50 - 2x^2 \Rightarrow 2x^2 = 32$

$\Rightarrow x^2 = 16 \Rightarrow x = \pm 4$ (so $x \neq \pm 4$)

Thus $-5 \leq x \leq 5$ and $x \neq -4$ and $x \neq 4$

domain: $[-5, -4) \cup (-4, 4) \cup (4, 5]$