Math 220 (section AD?) Quiz 1 Spring 2013

Name SOLUTIONS

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

1. (3 points) Suppose that $f(x) = 1 + \sqrt{3x-2}$ and $g(x) = 4 + \sqrt{10-2x}$. What is the domain of the composite function $(g \circ f)(x)$?

$(g \circ f)(x) = g(f(x))$

$= g(1 + \sqrt{3x-2})$

$= 4 + \sqrt{10 - 2(1+\sqrt{3x-2})}$

$= 4 + \sqrt{8 - 2\sqrt{3x-2}}$

$3x - 2 \geq 0 \Rightarrow x \geq \frac{2}{3}$

$8 - 2\sqrt{3x-2} \geq 0$

$8 \geq 2\sqrt{3x-2}$

$4 \geq \sqrt{3x-2}$

$16 \geq 3x - 2$

$18 \geq 3x$

$6 \geq x$

$x \geq \frac{2}{3}$ and $x \leq 6$

$\frac{2}{3} \leq x \leq 6$

domain $(g \circ f)$: $\left[\frac{2}{3}, 6\right]$

2. (1 point) Evaluate the quantity $\csc(-\pi/6)$.

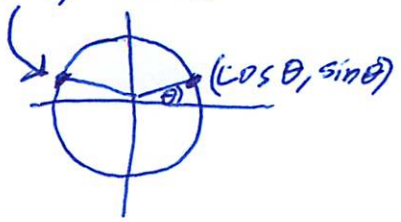
$\csc\left(-\frac{\pi}{6}\right) = \frac{1}{\sin\left(-\frac{\pi}{6}\right)} = \frac{1}{-1/2} = -2$

3. (3 points) Given an acute angle θ for which $\cos\theta = 1/3$, evaluate the following product.

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

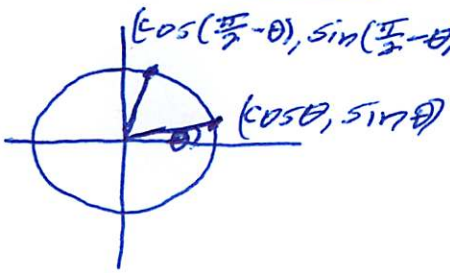
unit circles

$(\cos(\pi-\theta), \sin(\pi-\theta))$



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

$(\cos(\frac{\pi}{2}-\theta), \sin(\frac{\pi}{2}-\theta))$



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

$= \sin\theta \cdot \sin\theta$

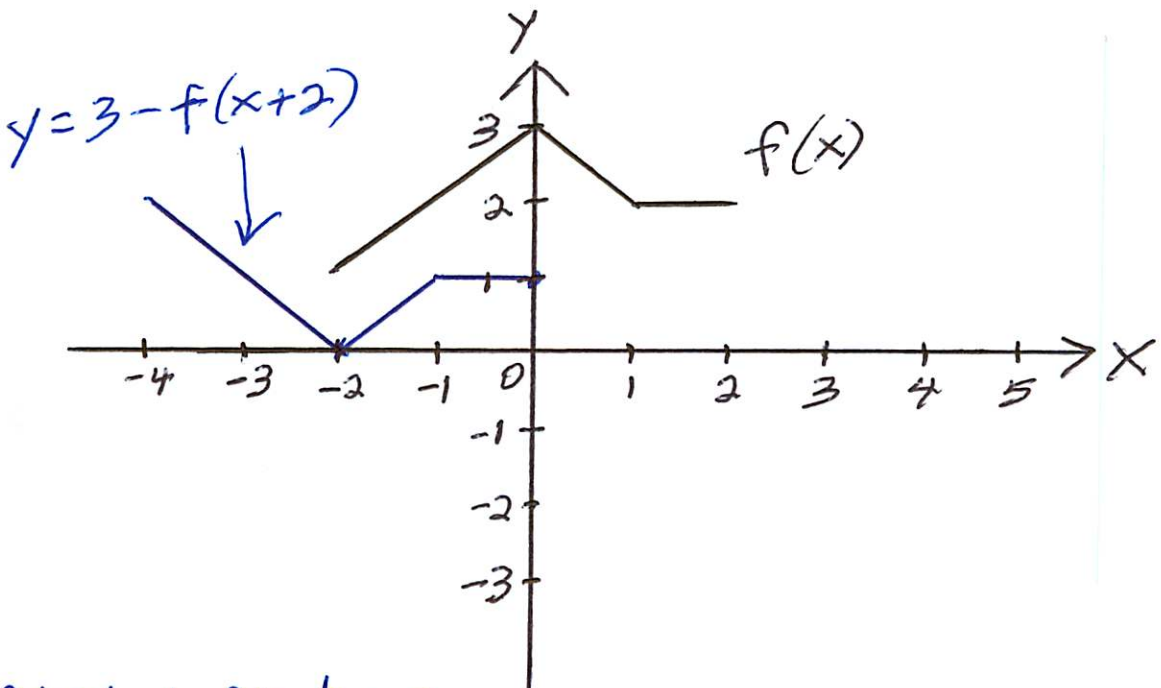
$= \sin^2\theta$

$= 1 - \cos^2\theta$

$= 1 - (\frac{1}{3})^2$

$= \frac{8}{9}$

4. (3 points) The graph of $y = f(x)$ is given. Draw the graph of $y = 3 - f(x+2)$.



we shifted left by 2 units,
then flipped over the x-axis,
and finally shifted up by 3 units.