

Test Unit 2
PCHA 2020-21 / Dr. Kessner

Name:

No calculator, no notes – just your brain! Have fun!

1. Evaluate the following:

a) $\sec \frac{5\pi}{3}$

b) $\sin(-\frac{2\pi}{3})$

c) $\cos^{-1}(\cot(-\frac{5\pi}{4}))$

d) $\sin^{-1}(\cos(-\frac{\pi}{2}))$

e) $\tan^{-1}(\cot(\frac{\pi}{6}))$

f) $\sin(-\frac{\pi}{12})$

2. Write down all the relevant properties (period, amplitude, shifts/scales, asymptotes) of the following trig functions, and then graph by hand.

$$f(x) = 4 + 4 \cos\left(\frac{\pi}{6}x - \frac{\pi}{2}\right)$$

$$g(x) = 5 \cot\left(\frac{\pi}{8}(x - 4)\right)$$

Bonus Write f as a transformed sin and g as a transformed tan.

3. Prove the identities:

$$\frac{\cos x + \sin x}{\cos x - \sin x} = \sec 2x + \tan 2x$$

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

Bonus Prove this using cofactor identities.

4. Find all solutions of $\sin 2\theta + \cos \theta = 0$.

Derive the following half angle formula from the relevant double angle formula:

$$\cos u = \pm \sqrt{\frac{1 + \cos 2u}{2}}$$

Use the half angle formula above to find $\cos(-\frac{5\pi}{12})$.

5. Solve the following triangle: $A = \frac{\pi}{4}$, $b = 5$, $c = 5\sqrt{2}$.