

**Precalculus BC**  
**Last-Ditch Review HW**

1. If  $\sin a = 4/15$  and  $0 < a < \pi/2$ , find

a.  $\sin(a + 5\pi/4)$                       b.  $\cos(\pi - a)$                       c.  $\tan(a/2)$

2. Simplify:  $\cos(x + \pi/4) + \cos(x - \pi/4)$ .

3. Simplify:  $\sin(\sin^{-1} 3/5 - \cos^{-1}(-4/5))$ .

4. Prove or disprove:  $\tan x = \frac{1 - \cos 2x}{\sin 2x}$

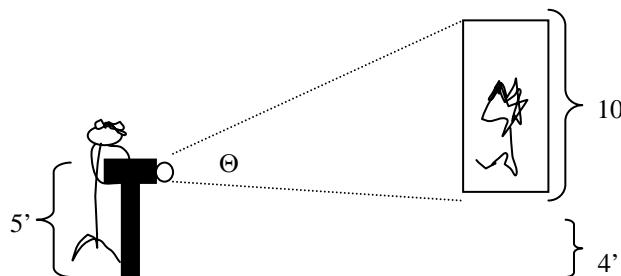
5. PODASIP:  $\cos^3 x \sin^2 x = (\sin^2 x - \sin^4 x) \cos x$

6. PODASIP:  $\frac{\sin x + \sin 3x}{2 \sin 2x} = \cos x$

7. Simplify:  $\sin\left(\cos^{-1} \frac{2x+1}{\sqrt{13}}\right)$

8. Kevin is trying to see what Sam is doing at his desk at home. He concocts a plan by which he sets up a telescope outside Sam's room and sneakily peers into his window.

The telescope stands 5 feet high and the window is 10 feet tall (a picture window) and begins 4 feet above the ground.



a. Express the angle  $\theta$  as a function of the distance from shady Kevin to the window.

b. If shady Kevin is 27 feet away from the window, what is the measure of  $\theta$ ?

9. Solve for all  $x$  in  $[0, 2\pi)$ :  $2 \cos 5x = \sqrt{3}$

10. Solve exactly for all  $x$  in  $[0, 2\pi)$ :  $\cos 2x + \cos x = 1$ .

11. A cone has vertex angle  $\theta$  and base radius 10cm.

a. Find the volume of the cone in terms of  $\theta$ . Because this is HW, I'm expecting that you'll look up the formula

b. Find the value of  $\theta$  that maximizes the volume.

