

1. sine and cosine graphs

- (a) Using just triangle trig, explain why $\cos(\theta) \equiv \sin(\pi/2 - \theta)$.
- (b) Use the fact that cosine is an even function to rewrite the right hand side of the identity in part (a) to get a another different right hand side for $\cos(\theta)$.
- (c) Starting with the right hand side of your result in part (b) use the cheer to get back to $\cos(\theta)$
- (d) Use this second identity to explain a nice relationship between the graphs of $\sin(\theta)$ and $\cos(\theta)$.

2. What is the *Trig Pythagorean Identity*? Explain.

3. For each part of this question, be sure to explain how your answers to questions 1 and 2 justify your graph and evaluation of the integral.

- (a) *Without using a calculator*, sketch a *large* graph of $y = 3 \cos^2(2x)$ for $x \in [0, \pi]$ on your whiteboard.
- (b) Using a different color marker and a ruler, add the line $y = 3$ for $x \in [0, \pi]$ to you sketch.
- (c) Using *just* your drawing, a little bit of trig, and some thought evaluate:

$$\int_0^{\pi} 3 \cos^2(2x) dx$$

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