

MAT 120 — Homework 5 — Fall 2020

Due date: Thursday, Dec. 3

1. Find the values using a trig identity and special values:

(a)  $\sin^2(\frac{\pi}{4}) + \cos^2(\frac{\pi}{4})$

(b)  $\sin^2(\frac{\pi}{4}) + \cos^2(-\frac{\pi}{4})$

(c)  $\sin(\frac{\pi}{4} + \frac{\pi}{6})$

(d)  $\cos(\frac{\pi}{4} - \frac{\pi}{6})$

(e)  $\sin(\frac{\pi}{12})$

2. For each problem rewrite the product as a sum of trig functions.

(a)  $\sin(2\pi t) \cos(\frac{3}{2}\pi t)$

(b)  $\sin(2\pi t) \sin(2\pi t)$

(c)  $\sin(3\pi t) \sin(8\pi t)$

3. For each problem rewrite the sum as a product of trig functions. Then find the frequency of each of the factors. Also state how many beats per second this sum (or product) will have.

(a)  $\sin(200\pi t) + \sin(210\pi t)$

(b)  $\cos(330\pi t) + \cos(338\pi t)$

4. In each part graph the two functions  $f(t)$  and  $g(t)$  with dotted lines and then graph the sum  $f(t) + g(t)$  with a solid line. Include at least one full period of each function, including the sum.

(a)  $f(t) = 2\sin(\frac{1}{2}\pi t)$  and  $g(t) = -\sin(2\pi t)$ .

(b)  $f(t) = 2\sin(\frac{1}{2}\pi t)$  and  $g(t) = 3\sin(\pi t)$ .

(c)  $f(t) = \sin(\frac{2}{3}\pi t)$  and  $g(t) = -2\sin(\pi t)$ .