

HOMEWORK 8 - MATH 140

DUE DATE: Monday, November 1

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each homework problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. A spin balancer rotates the wheel of a car at 480 revolutions per minute. If the diameter of the wheel is 26 inches, what road speed is being tested? At how many revolutions per minute should the balancer be set to test a road speed of 80 miles per hour?
2. If θ is an angle in the standard position with $(\frac{1}{3}, -\frac{1}{4})$ on its terminal side, find $\sin \theta$ and $\cos \theta$.
3. Find the exact value of the remaining trigonometric functions of θ if

$$\sin \theta = -\frac{2}{3} \quad \text{and} \quad \pi < \theta < \frac{3\pi}{2}.$$

4. (a) Find all numbers θ for which $f(\theta) = \frac{1}{\cos \theta - 1}$ is not defined.
(b) Find the exact value of the sum $\cos 1^\circ + \cos 2^\circ + \dots + \cos 358^\circ + \cos 359^\circ$
5. Graph each of the following functions:
 - (a) $f(x) = -2 \sin(\frac{1}{2}x)$
 - (b) $g(x) = -5 \cos(2\pi x)$
6. The voltage V produced by an AC generator is $V = 120 \sin(120\pi t)$.
 - (a) What is the amplitude and what is the period?
 - (b) Graph V over two periods beginning at $t = 0$.
 - (c) If a resistance of $R = 20$ ohms is present, what is the current I ?
 - (d) What is the amplitude and period of the current I ?
 - (e) Graph I over two periods beginning at $t = 0$.
7. Use transformations to graph the following functions:
 - (a) $f(x) = -2 \tan(x + \frac{\pi}{4})$
 - (b) $g(x) = 3 \sec(x + \frac{\pi}{2})$
8. (a) Find the amplitude, the period and the phase shift of the function $f(x) = 3 \cos(-2x + \frac{\pi}{2})$. Graph the function by hand showing at least one period.
(b) Write the equation of a sine function $f(x) = A \sin(\omega x - \phi)$, $A > 0$, that has amplitude 2, period π and phase shift -2 .