

HOMEWORK 7 - MATH 140

DUE DATE: Monday, October 25

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. Find the domain and roughly sketch the graph of the function $f(x) = \log_{1/2}(x - 3)$.
2. Find the domain of the function $f(x) = \ln\left(\frac{x-2}{x^2+4x+3}\right)$.
3. Express y as a function of x if $3 \ln y = \frac{1}{2} \ln(2x + 1) - \frac{1}{3} \ln(x + 4) + \ln C$.
4. Solve the equations
 - (a) $2^{2x} + 2^{x+2} - 12 = 0$
 - (b) $\log_2(3x + 2) - \log_4 x = 3$
5. Solve the equation $\log_{1/3}(x^2 + x) - \log_{1/3}(x^2 - x) = -1$.
6. Convert from degrees to radians and vice-versa as appropriate:

$$\frac{5\pi}{6}, \quad 240^\circ, \quad -\frac{5\pi}{4}, \quad -225^\circ$$

7. Let A denote the area of a sector of a circle of radius r formed by a central angle θ . Find the missing quantity.
 - (a) $r = 6$ feet, $\theta = 2$ radians, $A = ?$
 - (b) $\theta = \frac{1}{4}$ radian, $A = 6 \text{ cm}^2$, $r = ?$
 - (c) $r = 6$ meters, $A = 8 \text{ meters}^2$, $\theta = ?$
8. The radius of each wheel of a car is 15 inches. If the wheels are turning at the rate of 3 revolutions per second, how fast is the car moving? Express your answer in inches per second and in miles per hour.