

HOMEWORK 1 - MATH 140

DUE DATE: Monday, January 17

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) Find the roots of the equation $x^3 - 5x^2 - x + 5 = 0$ by factoring.
(b) Solve the linear inequality $2x + 7 > \frac{1}{2}(x - 3)$ and graph the solution set.
2. Find the distance between the two points $P = (-3, 2)$ and $Q = (7, -3)$. Then find the midpoint of the line segment \overline{PQ} .
3. Find the intercepts of $3x + y = -7$ and then use them to sketch its graph.
4. Find the center and the radius of the circle with equation $x^2 + y^2 - 4x + 6y + 9 = 0$.
5. Test for symmetry with respect to the x -axis, the y -axis and the origin the equation $y = \frac{x}{x^2 - 7}$. Describe in detail the test you are performing each time.
6. Consider the function $f(x) = \frac{3x+2}{5x-7}$.
 - (a) Is $(1, -\frac{2}{5})$ on the graph of f ?
 - (b) If $x = 2$ what is $f(x)$?
 - (c) Find the domain of f .
 - (d) Find the x - and the y -intercepts of the graph of f .
7. Find the domain, symmetry, monotonicity and local extrema of the function $y = f(x)$ whose graph is sketched below.
8. Use your calculators to graph the function $f(x) = \frac{1}{3}x^3 - x$ in the interval $(-2, 2)$. Then find for this graph the domain, symmetry, monotonicity and local extrema.