

TEST 3 - MATH 140

DATE: Friday, January 27

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 5 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. (a) Consider the parabola with equation $f(x) = -4x^2 + 8x + 1$. Do the following:
 - i. Find its vertex and its opening direction. (1 point)
 - ii. Find its x - and its y -intercepts; you are given that $\sqrt{5} \cong 2.2$. (1 point)
 - iii. Roughly sketch its graph. (1 point)(b) Find the equation of the parabola with vertex $V = (5, -2)$ that goes through the point $(-1, 20)$. (2 points)
2. Solve the following quadratic inequalities:
 - (a) $x(5x - 14) \geq 3$ (3 points)
 - (b) $f(x) > g(x)$, where $f(x) = -x^2 + 4$ and $g(x) = -x - 2$. (2 points)
3. A farmer with 12,000 meters of fencing is to enclose a rectangular field of dimensions x meters by y meters and then divide it into three plots with two fences parallel to the sides of length x .
 - (a) Write an equation for the total length of fencing used. (1 point)
 - (b) Express the area of the plot in terms of x . (2 points)
 - (c) Find the maximum area that can be enclosed. (2 points)
4. (a) The diagonal of a rectangle measures 10 inches. If the length is 2 inches more than the width, find the dimensions of the rectangle. (3 points)
(b) Solve the equation $\sqrt{2x + 3} - \sqrt{x + 1} = 1$. (2 points)
5. (a) Solve the absolute value equation $|3x - 5| = 8$. (1 point)
(b) Solve the absolute value equation $|x^2 + x - 1| = 1$. (2 points)
(c) Solve the absolute value inequality $|12 - 7x| \geq 3$. (2 points)