

EXAM 1 - MATH 140

DATE: Tuesday, September 20

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. A line L passes through the points $(-5, 9)$ and $(5, -3)$.
 - (a) Find the equation of L .
 - (b) Find the intercepts of L and then plot the graph of L .
 - (c) Find the equation of the line that is perpendicular to L and passes through the point $(0, 1)$.
2. A 20-pound bag of Economy brand cement mix contains 25% cement and 75% sand. How much pure cement must be added to produce a cement mix that is 40% cement?
3. A bathroom tub will fill in 15 minutes with both faucets open and the stopper in place. With both faucets closed and the stopper removed, the tub will empty in 20 minutes. How long will it take for the tub to fill if both faucets are open and the stopper is removed?
4. Study (find vertex, opening direction, intercepts and sketch the graph) the quadratic function $f(x) = x^2 - 2x - 15$.
5.
 - (a) Find the equation $y = f(x)$ of the parabola with vertex $V = (1, 1)$ passing through the point $(10, -8)$.
 - (b) Solve the quadratic inequality $f(x) < 0$, where $y = f(x)$ is the equation of the parabola from Part (a).
6. A farmer with 12,000 meters of fencing wants to enclose a rectangular field and then divide it into two plots with a fence parallel to one of the sides (see figure). What is the largest area that can be enclosed?