

# TEST 2 - MATH 140

DATE: Friday, January 20

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!!

- Suppose that line  $L_1$  passes through the points  $(-2, 5)$  and  $(3, -1)$ .
  - Find the slope of  $L_1$ . (1 point)
  - Find an equation for the line  $L_1$ . (2 points)
  - Find the slope of the line  $L_2$  that passes through  $(0, 3)$  and is parallel to  $L_1$ . (1 point).
  - Find an equation of the line  $L_2$ . (1 point)
- Let  $L_1$  be the line with equation  $2x + 5y = 9$ .
  - Find the slope of  $L_1$ . (2 points).
  - Find the slope of the line  $L_2$  that is perpendicular to  $L_1$  and passes through the point  $(1, 3)$ . (1 point)
  - Find an equation of the line  $L_2$ . (2 points)
- A 20-pound bag of Economy brand cement mix contains 25% cement and 75% sand. Additional cement is to be added to the mix to produce a higher quality mix with 40% cement.
  - Find how many pounds of cement and how many pounds of sand there are in the original mix. (1 point)
  - Suppose that  $x$  pounds of cement are to be added to the original mix. How many pounds of cement and how many pounds of sand will there be in the new mix? (1 point)
  - Set up an equation of the form (pounds of cement in new mix)/(total pounds in new mix) equals 40/100. (2 points)
  - Solve the equation to find how many pounds of cement should be added to produce the 40% mix.
- Use the quadratic formula to find the solutions of the equation  $2x^2 + 5x + 3 = 0$ . (2 points)
  - Without solving the equation  $25x^2 - 20x + 4 = 0$  determine how many solutions it has. (1 point)
  - Use the substitution method to compute the roots of the equation  $x^6 + 7x^3 - 8 = 0$ . (2 points)
- A jumbo chocolate bar with a rectangular shape measures 10 centimeters in length, 7 centimeters in width and 2 centimeters in thickness. The company producing the bar has decided to reduce the volume of the bar to  $\frac{4}{7}$  the original volume. To accomplish this reduction, the management has decided that the new bar should have the same thickness as the old, but the length and width should be reduced by an equal number of centimeters.
  - How many cubic centimeters is the volume of the original and how many the volume of the new bar? (1 point)
  - Set  $x$  the number of centimeters by which each of the length and width of the new bar will be reduced. Find the length and the width of the new bar in terms of  $x$ . (1 point)
  - Set up an equation of the form (new length)(new width)=(new volume). (1 point)
  - Solve the equation to find the dimensions of the new bar. (2 points)