

EXAM 2 - MATH 140

DATE: Friday, September 29

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!!

- How much water must be evaporated from 240 gallons of a 3% salt solution to produce a 5% salt solution?
 - Pick variable(s) for the problem and state **clearly** in full sentences what they represent. (1 point)
 - Write down equation(s) involving your variables that reflect the data in the problem. (2 points)
 - Solve your equation(s) to answer the question in the problem. (2 points)
- An oil tanker can be emptied by the main pump in 4 hours. An auxiliary pump can empty the tanker in 9 hours. If the main pump is started at 9 AM, when should the auxiliary pump be started so that the tanker is emptied by noon?
 - Pick carefully your variables and state **clearly** what they represent. (**Hint:** Pick a variable p for the pumping rate in gallons per hour of the main pump and q for the pumping rate in gallons per hour of the auxiliary pump. Which other variables would you need?) (1 point)
 - Write some equations using your variables that reflect the data in the problem. (2 points)
 - Solve the equations to answer the question posed in the problem. (2 points)
- Consider the parabola with equation $f(x) = -x^2 + 5x + 6$. Do the following:
 - Find its vertex and its opening direction. (1 point)
 - Find its x - and its y -intercepts. (1 point)
 - Roughly sketch its graph. (1 point)
 - Find the equation of the parabola with vertex $V = (3, -1)$ that goes through the point $(-2, -7)$. (2 points)
- Use the quadratic formula to find the solutions of the equation $3x^2 + 5x - 8 = 0$. (2 points)
 - Solve the equation $x^8 - 17x^4 + 16 = 0$. (1 point)
 - Solve the quadratic inequality $x^2 + x - 2 \leq 0$. (2 points)
- The price p and the quantity x sold of a certain product obey the demand equation $x = -20p + 500, 0 \leq p \leq 25$.
 - Express the revenue R as a function of x . (1 point)

- (b) What is the revenue if 20 units are sold? (1 point)
- (c) What quantity x maximizes the revenue? (1 point)
- (d) What is the maximum revenue? (1 point)
- (e) What price should the company charge to maximize the revenue? (1 point)