

EXAM 2 - MATH 111

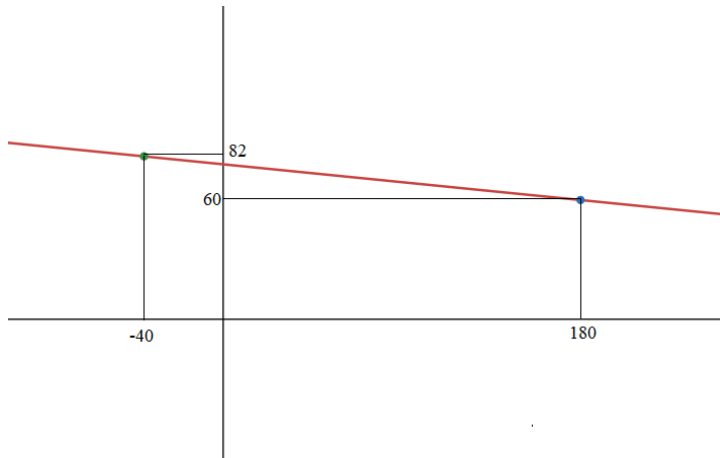
Friday, October 11

YOUR NAME: _____

George Voutsadakis

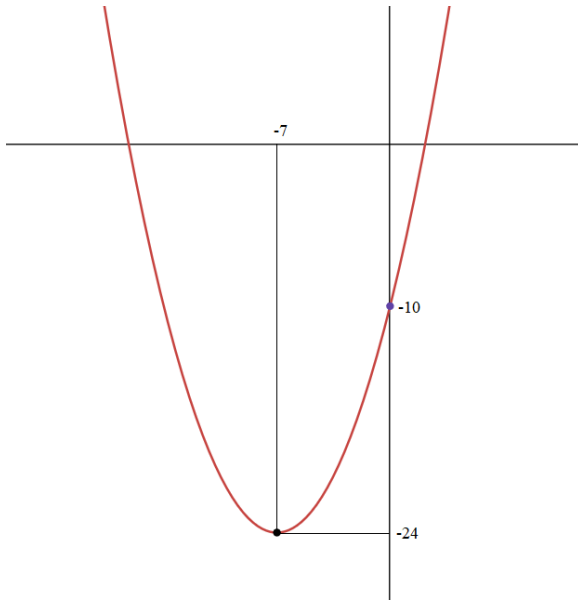
Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. (a) Find an equation for the line shown in the figure.



- (b) Find an equation for the line that is perpendicular to the line shown above and passes through the point $(100, 80)$.

2. (a) Find an equation for the parabola shown in the figure.



- (b) Consider the parabola with equation

$$f(x) = -3x^2 + 72x - 50.$$

Write the equation in standard form.

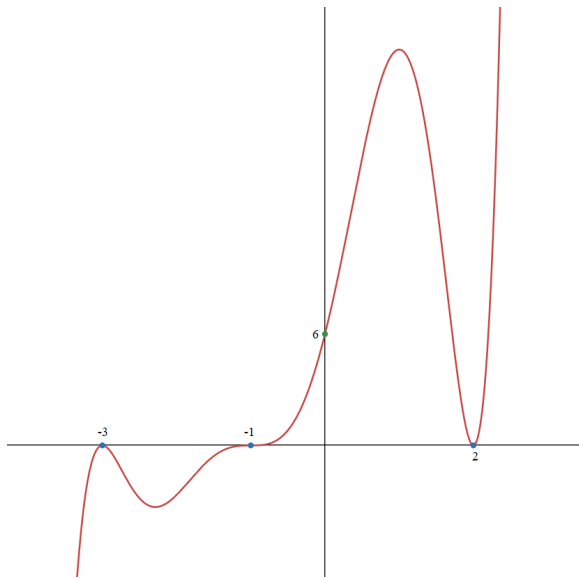
3. A farmer finds that, if she plants 75 trees per acre, each tree will yield 40 bushels of fruit, whereas, if she plants 81 trees per acre, the yield per tree falls to only 28 bushels.

(a) Assuming that the relation of the yield Y per tree in terms of the number of trees n planted is linear, find an equation for $Y(n)$.

(b) Find an equation for the total harvest $H(n)$ per acre as a function of the number n of trees planted.

(c) Help the farmer decide how many trees to plant per acre in order to maximize the total harvest per acre.

4. Consider the function $y = f(x)$ whose graph is shown in the figure.



- (a) Describe formally the end behavior.
- (b) Find the x -intercepts with their multiplicities.
- (c) Give a possible formula for $y = f(x)$.

5. (a) Perform the long division and write your answer in an appropriate form.

$$(4x^3 - 5x^2 + 2) \div (x^2 + 1).$$

- (b) Perform the synthetic division and write your answer in an appropriate form.

$$(4x^3 - 4x + 3) \div (x + 2).$$