

Honors Analysis

Name _____

Copy original problem.

Per _____

Date _____

Convince *me* that **you** understand the concept!**No Calculators!**

Chapter 2 Exam

I Given: the parabola $x^2 - 6x - 16y - 23 = 0$ and the line through the focus of the parabola with slope three-fourths. Do **NOT** use decimal fractions. (40 pts total)
Remember to be very clear concerning your methods. Answer only is unacceptable.

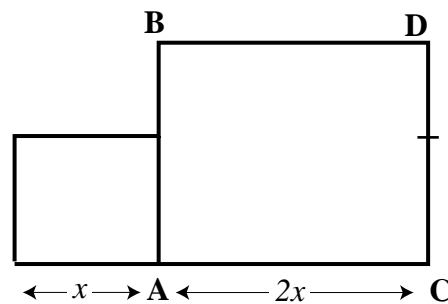
- Re-write the equation of the parabola in graphing form (using the method of completing the square).
- Determine the coordinates of the focus.
- Determine the equation of the given line.
- Determine the coordinates common to both the line and the parabola.
- Sketch the parabola, the line through the focus and the directrix of the parabola on the same axis.
- Draw vertical lines from the points found in part “d” to the directrix.
- Find the area of the four-sided figure formed by the two lines drawn in step “f”, the directrix and the line with slope three-fourths.

II Solve for all values x (including complex numbers). Show RRTS at work. **Write each equation in factored form** where the factors are either first degree or prime, second degree. (15 pts ea)
Do **NOT** use decimal fractions.

- $15x^4 + 61x^3 + 57x^2 - 11x - 10 = 0$
- $6x^5 - 29x^4 + 40x^3 - 7x^2 = 12x$

III Application. Be especially sure to use the proper set-up and answer the question asked using a complete sentence. Do **NOT** use decimal fractions. (30 pts total)

- Two adjacent pens are to be constructed using 2,400 feet of fencing. The smaller pen is square and the other is rectangular. See the picture. What is the maximum area which can be enclosed? (hint: Notice that AB and CD are the same length. An expression for that length will be useful. Label each length of fence in the picture in terms of x .)
- The sum of two positive numbers is three. What is the smallest total that can be made when the square of one of the numbers is added to the other number?
- Explain** how you know that you have the absolute maximum in part A and the absolute minimum in part B. **Explain** how your methods for solution to part A differed from your methods for solution for part B **and why**.



Extra Credit ----- **5 pts** -----

Augustus De Morgan was alive during the nineteenth century and once wrote, “I was x years old in the year x^2 . What was the year of his birth?”