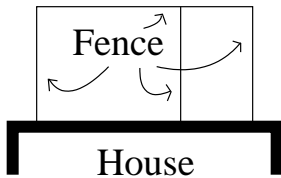


Problem 1 (10 points)

Graph the parabola $y = -3x^2 + 6x + 4$, clearly marking x - and y -intercepts and the vertex in your picture.

Problem 2 (15 points)

I want to keep chickens and rabbits in a divided rectangular pen in my back yard, adjacent to my house (see the diagram below). I have 18 yards of fencing material. What is the largest area I can enclose? (Please show your strategy as well as your solution.)

**Problem 3** (10 points)

Graph $f(x) = 2 + 2^{-x}$. Indicate asymptotes and intercepts. What is the range of f ?

Problem 4 (15 points)

What is the domain of $f(x) = \log_4(2x - 3)$?

Find all values of x such that $\log_4(2x - 3) \leq 1$.

Problem 5 (15 points)

Find all roots and asymptotes of the following rational function. Find the equation of its horizontal asymptote, and find all points at which your function crosses this horizontal asymptote. Sketch a graph of this function which takes into account all of this information, as well as any other analysis you find helpful.

$$y = \frac{(x - 1)^2}{(x + 2)(x + 4)}.$$

Problem 6 (15 points)

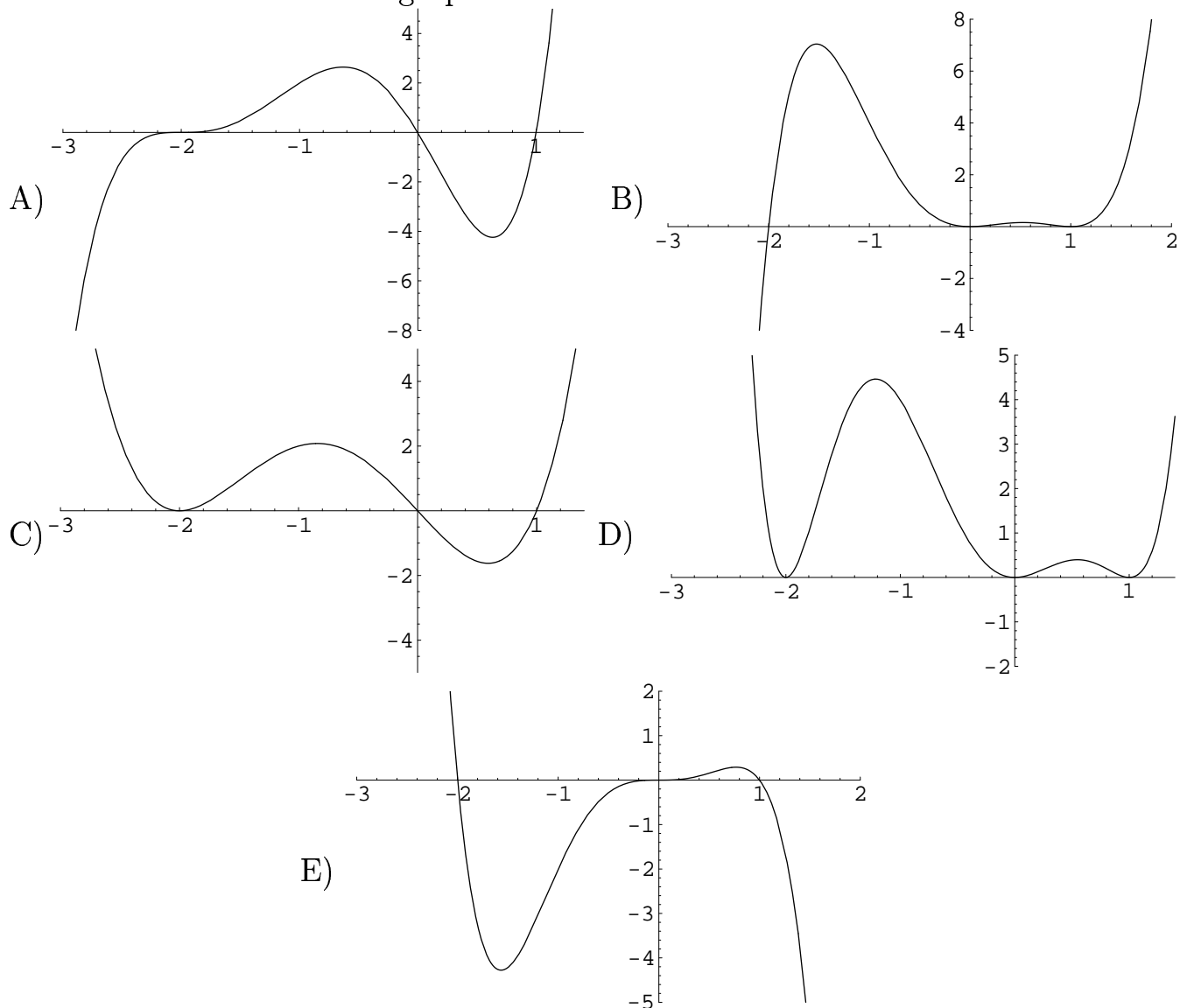
Solve the equation $5^{2x} + 5^x - 6 = 0$.

Problem 7 (10 points)

Write as a single logarithm: $3 \log x - 2 \log(x + 1) + \frac{1}{2} \log(x + 2)$

Problem 8 (10 points)

Match each function to its graph.



_____ $y = (1 - x)(x + 2)x^3$

_____ $y = (x - 1)^2(x + 2)^2x^2$

_____ $y = (x - 1)(x + 2)^2x$

_____ $y = (x - 1)^2(x + 2)x^2$

_____ $y = (x - 1)(x + 2)^3x$