

1. **Short-Answer Questions.** Each question is worth 2 points. Put your answer in the box provided and show your work. No credit will be given for the answer without the correct accompanying work.

(a) Determine where  $\frac{(x-2)^{23}(2x+4)^{22}}{e^{x-3}(2x-3)^{22}(3+x)^{21}} > 0$

Answer:

(b) Find all the asymptotes of  $y = \frac{3x^2 + \ln x}{x^2 - 1}$

Answer:

(c) Find the absolute maximum of  $y = \ln(1 - x^2)$ .

Answer:

2. **Long-Answer Question.** A gas pipeline is to be constructed from a storage tank, which is right on a road, to a house which is 600 feet down the road and 300 feet back from the road. Pipe laid along the road costs \$8.00 per foot, while pipe laid off the road costs \$10.00 per foot. What is the minimum cost for which this pipeline can be built?

*(Assume the pipeline path is piecewise linear, with at most two pieces.)*

Answer: