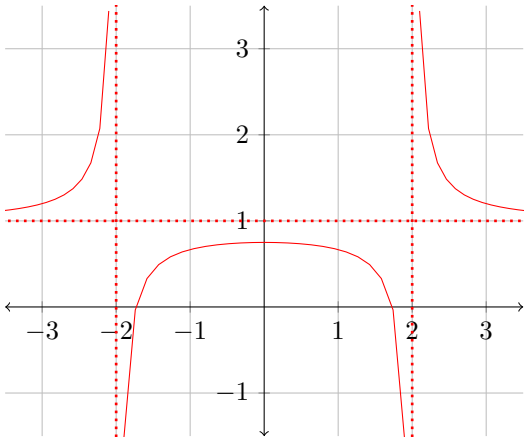
MA 16010: Applied Calculus 1 Extra Credit 3 (Solutions)

Please show **all** your work! Answers without supporting work will not be given credit. Write answers in spaces provided.

Name:_____

1. Using the graph below, answer the following questions:



I. Determine the vertical asymptote(s).

II. Determine the horizontal/slant asymptote.

III. Using I and II, determine which function below represents the graph?

(a) $f(x) = \dfrac{x+2}{x-2}$

(b) $f(x) = \dfrac{x-3}{(x-2)(x+2)}$

(c) $f(x) = \dfrac{x^2-4}{x-1}$

(d) $\boxed{f(x) = \dfrac{x^2-3}{(x-2)(x+2)}}$

Solution:

I. Note from the graph we have **Vertical Asymptotes** at $\boxed{x = -2 \text{ and } x = 2}$.

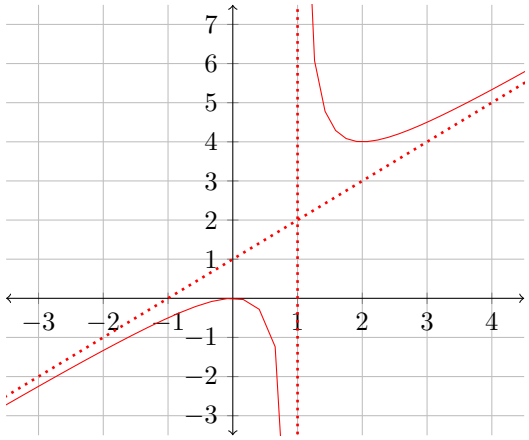
II. Note that we have a **Horizontal Asymptote** at $\boxed{y = 1}$.

III. By part (a), we have to have $(x-2)(x+2)$ in our denominator. i.e. We can eliminate the following choices.

~~A~~ B ~~C~~ D

By part (b), the difference between the leading terms of the numerator and denominator has to be 0. i.e. The leading terms has the same degree. Hence D is our answer.

2. Using the graph below, answer the following questions:



I. Determine the vertical asymptote(s).

II. Determine the horizontal/slant asymptote.

III. Using I and II, determine which function below represents the graph?

(a) $f(x) = \dfrac{2x^2+1}{x-1}$

(b) $f(x) = \dfrac{x^2}{(x-1)(x+1)}$

(c) $\boxed{f(x) = \dfrac{x^2}{x-1}}$

(d) $f(x) = \dfrac{x-1}{x^2}$

Solution:

I. Note from the graph we have **Vertical Asymptotes** ONLY at $\boxed{x=1}$.

II. Note that we have a **Slant Asymptote** at $\boxed{y=x+1}$.

III. By part (a), we have to have $x-1$ in our denominator. i.e. We can eliminate the following choices.

A ~~B~~ C ~~D~~

By part (b), notice that we have a **Slant Asymptote**. i.e. The difference between the leading terms of the numerator and denominator has to be 1. Since A and C, both satisfy this condition, we have to perform Synthetic Division which yields C is our answer.