

Exploring the Limit as x Approaches Infinity

Lab 4

1. Run the program **limin()**.
2. Select **[F1] Enter f(x)** and enter $(2x^2 - x + 3) / (3x^2 - 5)$ for $f(x)$.
3. Select **[F2] Find Limits**. Select **1:Limit as $x \rightarrow -\infty$** to investigate the limit as $x \rightarrow -\infty$.

The limit seems to be _____.

4. Select **[F2] Find Limits**. Select **2:Limit as $x \rightarrow +\infty$** to investigate the limit as $x \rightarrow +\infty$.

The limit seems to be _____.

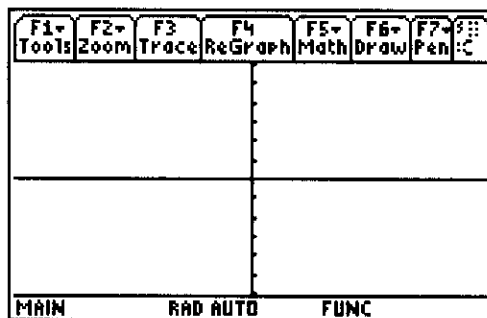
5. Select **[F3] Graph** and enter the window **[-5, 5] x [-6,**

6]. Use \odot and \odot to trace to examine the limit as $x \rightarrow +\infty$ and as $x \rightarrow -\infty$. Press **[ENTER]**.

6. Select **[F4] Enter Model** and enter a guess for the End Behavior Model (EBM). Continue guessing until you have an appropriate model.

The EBM is $y =$ _____.

Sketch $F(x)$ and the EBM on the axes provided. Press **[ENTER]**.



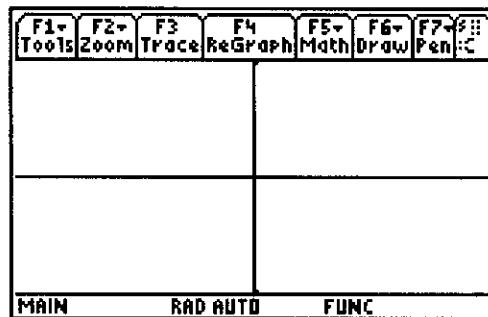
7. Repeat steps 2-6 for the following function, making appropriate window changes.

a. $F(x) = \frac{2x + 3}{5x + 7}$

$\lim_{x \rightarrow -\infty} F(x) =$ _____

$\lim_{x \rightarrow \infty} F(x) =$ _____

end behavior model _____



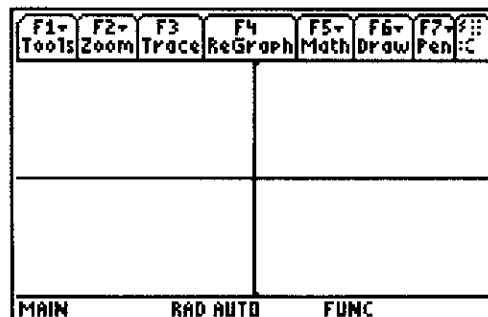
[-5, 5] x [-1, 1]

b. $F(x) = \frac{3x^3 + 5}{7x^3 - 2x^2 + 1}$

$\lim_{x \rightarrow -\infty} F(x) =$ _____

$\lim_{x \rightarrow \infty} F(x) =$ _____

end behavior model _____



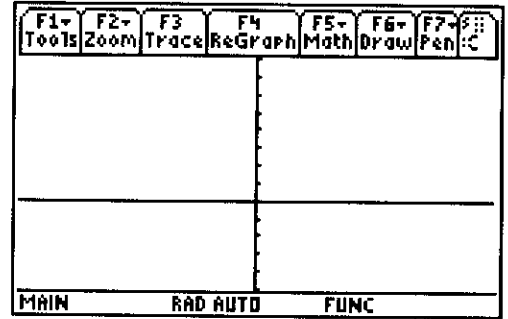
[-5, 5] x [-1, 1]

d. $f(x) = \frac{x^4 - 3x^2 + x - 1}{x - 2}$

$\lim_{x \rightarrow -\infty} F(x) =$ _____

$\lim_{x \rightarrow \infty} F(x) =$ _____

end behavior model _____



[-5, 5] x [-50, 80]

12. For the four examples in question 11, how does your end behavior model compare with the original $F(x)$? Generalize your results.

13. In summary, the rules for finding limits of rational functions as $|x| \rightarrow \infty$ are:

1) _____

2) _____

3) _____
