

Chapter 10 / **Example 9**

Use $\frac{dy}{dx} = 0$ to find a maximum or minimum point

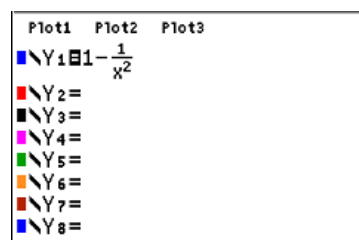
Consider the derivative function $\frac{dy}{dx} = 1 - \frac{1}{x^2}, x \neq 0$.

- Plot the curve on a GDC.
- Find the values of x at which $\frac{dy}{dx} = 0$.
- State whether these points represent local maximum or minimum points on the curve for y , justifying your answer.

Press $[F1]$ $[Y=]$ to display the equation entry screen.

Type $1 - \frac{1}{x^2}$ and press $[ENTER]$ to enter the equation as Y_1 .

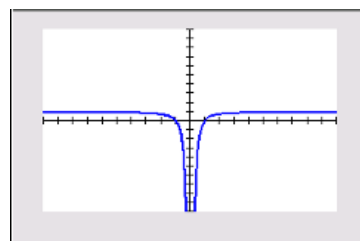
Use the fraction template: $[ALPHA]$ $[F1]$ 1:n/d.



Press $[F5]$ $[GRAPH]$ when you have finished.

The GDC displays the graph Y_1 .

The default axes are $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$.

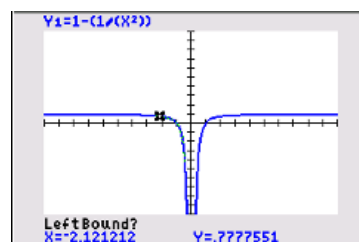


To find the zeros press $[2nd]$ $[F4]$ $[CALC]$ 2:zero

You will need to give the left and right bounds of the region that includes the zero.

The GDC shows a point on the curve and asks you to set the left bound. Move the point using \sim $|$ and choose a position to the left of the zero.

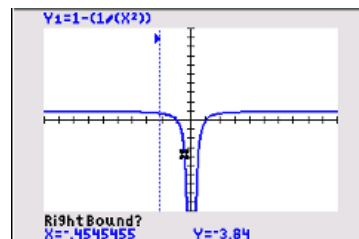
Press $[ENTER]$.



The GDC shows a line where you have set the left bound and a point on the curve.

Move the point using \sim $|$ and choose a position to the right of the zero.

When the region contains the zero, Press $[ENTER]$.

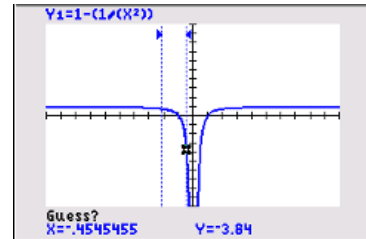


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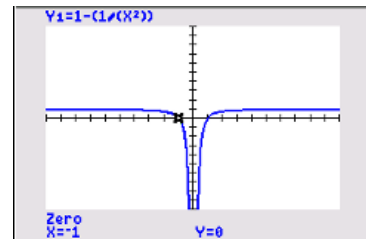
The GDC requires an initial guess for the position of the zero.
Choose the default position.

Press **ENTER**.



The GDC displays a zero at $(-1, 0)$.

$x = -1$ will be a maximum point as the gradient changes from positive to negative.



Repeat for the second zero.

The GDC displays a zero at $(1, 0)$.

$x = 1$ will be a minimum point as the gradient changes from negative to positive.

