

Chapter 12 / Example 6

Finding the gradient of a curve at a point

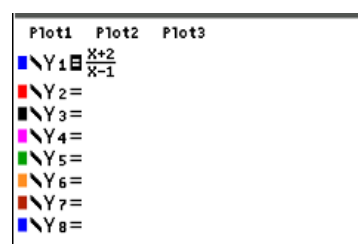
Consider $y = \frac{x+2}{x-1}, x \neq 1$.

Find the gradient of the curve at the point where $x = 2$ and $x = 3$.

The gradient of the curve can be found in two ways with the GDC: either it can be found from the graph or as a calculation using the numerical derivative function.

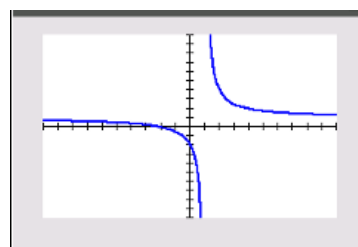
To find the gradient from the graph press $[f1]$ $[y=]$ to display the equation entry screen.

Type $\frac{x+2}{x-1}$ using $[ALPHA]$ $[f1]$ 1:n/d to select the fraction template and press $[enter]$ to enter the equation as Y_1 .



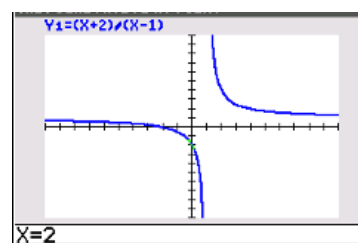
Press $[f5]$ $[graph]$ to display the graph screen.

The GDC displays the graph $Y_1 = \frac{x+2}{x-1}$ with the default axes.



To find the gradient at $x = 2$ press $[2nd]$ $[calc]$ 6:dy/dx.

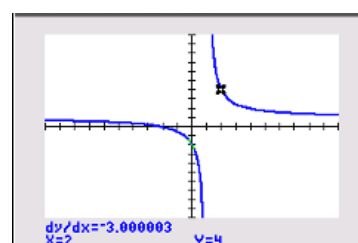
Type 2, the value of the x-coordinate, and press $[enter]$.



The GDC displays a point on $f(x) = \frac{x+2}{x-1}$ and the gradient of the curve at that point.

$$f'(2) = -3.$$

Take care to interpret what the GDC display. -3.000003 is very close to -3 . The small difference is due to the numerical way that the GDC calculates the value.



Chapter 12 / Example 6

Finding the gradient of a curve at a point

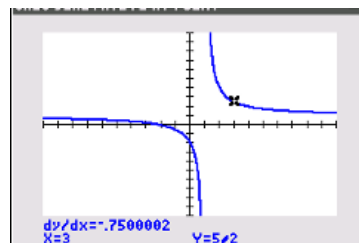
To find the gradient at $x = 3$ press **[2nd]** **[calc]** 6:dy/dx.

Type 3, the value of the x-coordinate, and press **[enter]**.

The GDC displays a point on $f(x) = \frac{x+2}{x-1}$ and the gradient of the curve at that point.

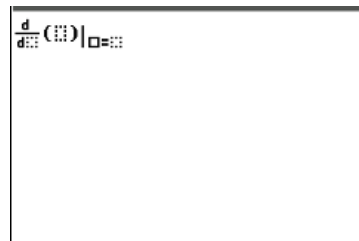
$$f'(3) = -0.75.$$

Take care to interpret what the GDC display. -0.7500002 is very close to -0.75 . The small difference is due to the numerical way that the GDC calculates the value.



To use the numerical derivative function press **[2nd]** **[quit]** then press **[alpha]** **[f2]** 3:nDeriv

The template has spaces for the variable, x , the function and the value that it is evaluated at.



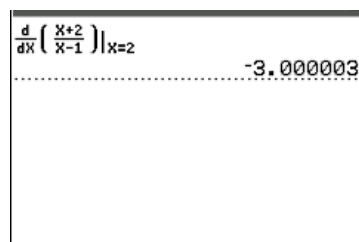
Enter X in the denominator and the function $\frac{x+2}{x-1}$ using

[ALPHA] **[f1]** 1:n/d to select the fraction template.

Type 2 and press **[enter]**.

$$f'(2) = -3.$$

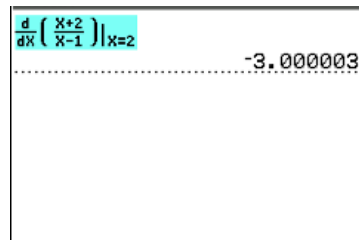
Take care to interpret what the GDC display. -3.000003 is very close to -3 . The small difference is due to the numerical way that the GDC calculates the value.



Copy the expression by pressing **▲** twice to highlight it and pressing **[enter]**.

Delete 2 and type 3.

Press **[enter]**.



Chapter 12 / **Example 6**

Finding the gradient of a curve at a point

The GDC displays the result:

$$f'(3) = -0.75.$$

Take care to interpret what the GDC display. -0.7500001875 is very close to -0.75 . The small difference is due to the numerical way that the GDC calculates the value.

$\frac{d}{dx} \left(\frac{x+2}{x-1} \right) _{x=2}$	-3.000003
$\frac{d}{dx} \left(\frac{x+2}{x-1} \right) _{x=3}$	$-.7500001875$