

Graphs of Gradient Functions

Each of the questions included here can be solved using either the TI-nspire CX or CX CAS.

Scan the QR code or use the link: <http://bit.ly/derivativegraphs>

Question: 1.

Determine where $f'(x) = 3$ given $f(x) = x(x-3)(x+3)$.



Question: 2.

Determine where $f'(x) = 0$ given $f(x) = x^4 - 8x^2 + 19$.

Question: 3.

If $f'(4) = 0$ and $f(x) = (x-a)^2 + 2$, determine the value of a .

Question: 4.

The line $y = x - 3$ is parallel to the tangent on the function $g(x) = x^2 + 5x - 6$ at the point $(a, g(a))$.
Determine the value of a .

Answers

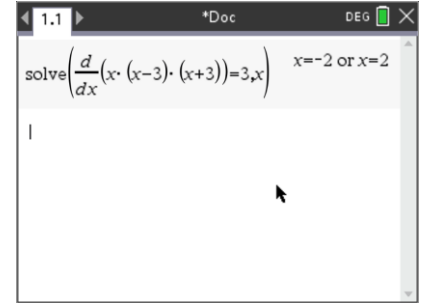
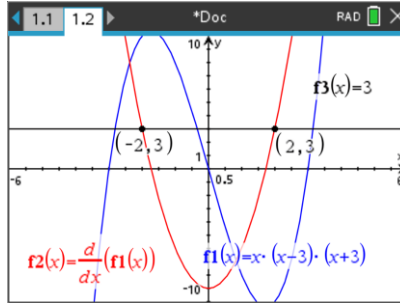
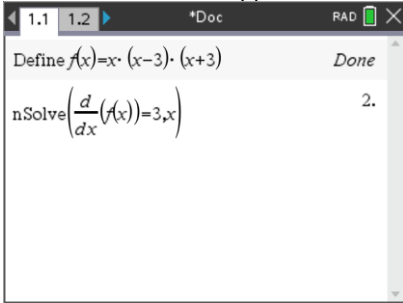
Question 1

TI-nspire CX series

It is possible to use the nSolve command, however in the absence of domain restrictions this method only determines one solution. The graph of the derivative and the line $y = 3$ makes it more obvious that two solutions exist as $x = -2$ and 2 .

TI-nspire CX CAS series

The solve command applied direction to the derivative finds all solutions.



Question 2

Using the same technique as above. Solution: $x = -2, 0$ and 2 . OR $(-2, 3), (0, -19)$ and $(2, 3)$.

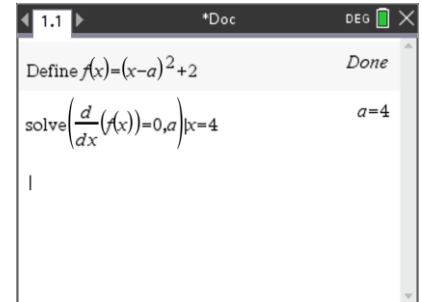
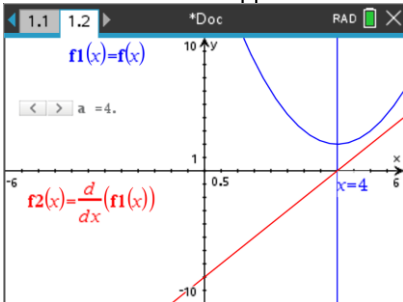
Question 3

TI-nspire CX series

The nSolve command does not work for a problem such as this as the value of 'a' is not known so the numerical derivative cannot be determined. Graphing the function however produces a slider which can then be used to determine the solution.

TI-nspire CX CAS series

The solve command applied direction to the derivative finds the solution. ($a = 4$)



Question 4

TI-nspire CX series

The main step here is to realise that the tangent shares the same gradient as the function reducing this problem to the same process as Question 1, find the value of 'a' when the gradient = 1.

TI-nspire CX CAS series

The solve command applied direction to the derivative finds the solution.

