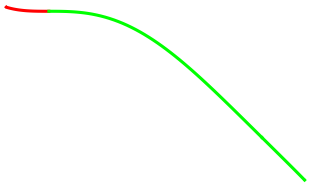
Software en Matemáticas - Derivación - 2019/2020
Relación-Derivación para para el dni: 15521571

Exercise 1

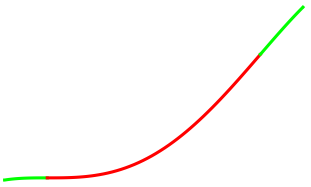
Study the shape properties of $f(x)=5-x^3+\frac{x^4}{2}$

to decide which amongst the following ones is the representation of the function.

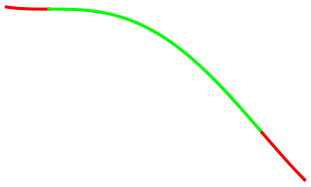
1)



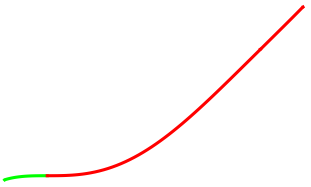
2)



3)



4)



● Big point: maximum

• Small point: minimum

Red line: convexity

Green line: concavity

Indication: To solve this exercise it is necessary to determine the concavity and convexity interval. To find the inflexion points separating the cancavity and convexity intervals, check (by means of Ruffini) with the points −2, −1, 0, 1, 2.

Exercise 2

Determine the derivative of the function $f(t)=t+\log(t+1)+4\sin(t)$ and compute its value at the point t=0.

1) $f'(0)=3$ 2) $f'(0)=-1$ 3) $f'(0)=2$ 4) $f'(0)=6$

Exercise 3

Compute the limit: $\lim_{x\to 1} \frac{\frac{137}{20} - 15\,x + 15\,x^2 - 10\,x^3 + \frac{15\,x^4}{4} - \frac{3\,x^5}{5} + \text{Log}\left[x^3\right]}{1 - 6\,x + 15\,x^2 - 20\,x^3 + 15\,x^4 - 6\,x^5 + x^6}$

1) 0

2) 1

3) $-\frac{1}{2}$

4) $-\infty$

5) $-\frac{2}{3}$

6) -1

7) ∞

Exercise 4

Compute the limit: $\lim_{x\to -3} \frac{-18 - 3\,x + 4\,x^2 + x^3}{18 + 21\,x + 8\,x^2 + x^3}$

1) -2

2) 5

3) ∞

4) -1

5) $-\infty$

6) 1

7) 0

Exercise 5

Between the months t=0 and t=6
, the true value of the shares of a company (in euros) are given by the function $C(t) = 14 - 6\,t^2 + 2\,t^3$.

Determine the interval where the value oscillates between the months t=2 and t=3.

1) It oscillates between 9 and 5.

2) It oscillates between 8 and 5.

3) It oscillates between 9 and 24.

4) It oscillates between 6 and 230.

5) It oscillates between 6 and 14.

Exercise 6

In a fish farm, data of precedings years reveal that, if the initial number of fishes is x (x in thousands), after one month they reproduce until a number of $f(x)=\frac{50\,x}{2+32\,x}$ fishes.

What number of fishes leads to the largest increase in the number of animals, f(x)−x?

1) $\frac{20}{9}$

2) $\frac{40}{3}$

3) $\frac{1}{4}$

4) $\frac{3}{16}$

5) $\frac{3}{19}$

Exercise 7

The yield of a tree plantation is given by $f(x)=\frac{-35+18\,x+9\,x^2}{16\,x^4}$, where x is the distance in meters between two trees.

What is the distance x that leads to the largest yield.

1) $\frac{35}{19}$

2) $\frac{1}{4}$

3) $\frac{5}{3}$

4) $\frac{17}{7}$

5) $\frac{19}{10}$

Exercise 8

Study the differentiability of the function $f(x)=\begin{cases} -e^{x+2}-3\cos(x+2)+4 & x\le -2 \\ x\,(3+\log(8))-3\,(x+3)\log(x+3)+6+\log(64) & -2<x<-1 \\ 3-\log(8) & -1\le x \end{cases}$

1) The function is differentiable for all points.

2) The function is not differentiable at any point.

3) The function is differentiable for all points except for x=−2.

4) The function is differentiable for all points except for x=−1.

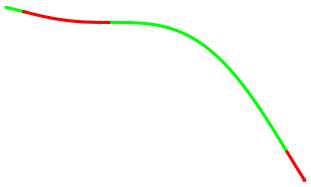
5) The function is differentiable for all points except for x=−2 and x=−1.

Software en Matemáticas - Derivación - 2019/2020
Relación-Derivación para para el dni: 26512836

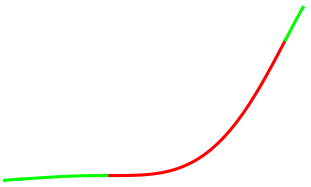
Exercise 1

Study the shape properties of $f(x)=5-20\,x^3-15\,x^4+2\,x^6$
to decide which amongst the following ones is the representation of the function.

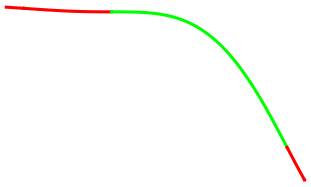
1)



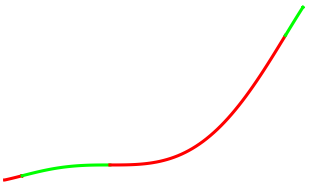
2)



3)



4)



● Big point: maximum

• Small point: minimum

Red line: convexity

Green line: concavity

Indication: To solve this exercise it is necessary to determine the concavity and convexity interval. To find the inflexion points separating the cancavity and convexity intervals, check (by means of Ruffini) with the points −2, −1, 0, 1, 2.

Exercise 2

Determine the derivative of the function $f(t)=-2\log(t+1)\sin\left(\sin(\cos(t))\right)$ and compute its value at the point t=0.

1) $f'(0)=-4$ 2) $f'(0)=-1$ 3) $f'(0)=-2\,\text{Sin}\left[\text{Sin}[1]\right]$ 4) $f'(0)=1$

Exercise 3

Compute the limit: $\lim_{x\to 0}\dfrac{-x^2+\text{Sin}\left[x^2\right]}{x^4}$

1) $-\dfrac{2}{3}$

2) ∞

3) -1

4) 0

5) 1

6) $-\infty$

7) -2

Exercise 4

Compute the limit: $\lim_{x \to 3} \frac{9x - 6x^2 + x^3}{6 - 5x + x^2}$

1) -1

2) $-\infty$

3) 1

4) $-\frac{1}{2}$

5) ∞

6) 0

7) -2

Exercise 5

Between the months $t=3$ and $t=8$, the true value of the shares of a company (in euros) are given by the function $C(t) = 106 + 72t - 21t^2 + 2t^3$.

Determine the interval where the value oscillates between the months $t=4$ and $t=7$.

1) It oscillates between 186 and 362.

2) It oscillates between 185 and 269.

3) It oscillates between 186 and 187.

4) It oscillates between 186 and 267.

5) It oscillates between 192 and 264.

Exercise 6

In a fish farm, data of precedings years reveal that, if the initial number of fishes is x (x in thousands), after one month they reproduce until a number of $f(x) = \frac{50x}{8 + 20x}$ fishes.

What number of fishes leads to the largest increase in the number of animals, $f(x) - x$?

1) $\frac{3}{5}$

2) $\frac{28}{17}$

3) $\frac{32}{7}$

4) $\frac{25}{7}$

5) $\frac{13}{16}$

Exercise 7

The yield of a tree plantation is given by $f(x) = \frac{-3 + 2x + 43x^2}{39x^8}$, where x is the distance in meters between two trees.

What is the distance x that leads to the largest yield.

1) $\frac{7}{5}$

2) $\frac{12}{43}$

3) 1

4) $\frac{7}{10}$

5) $\frac{29}{6}$

Exercise 8

Study the differentiability of the function $f(x) =$

$$\begin{cases} e^{x-2} + 4 & x \leq 2 \\ -e^2 (x-2) + e^{x-2} - 2x + 2x \sin(2) + 2\cos(2-x) + 8 - 4\sin(2) & 2 < x < 4 \\ -4x + 2(x-3)\log(x-3) - e^2 + 21 + 4\sin(2) + 2\cos(2) & 4 \leq x \end{cases}$$

1) The function is differentiable for all points.

2) The function is not differentiable at any point.

3) The function is differentiable for all points except for x=2.

4) The function is differentiable for all points except for x=4.

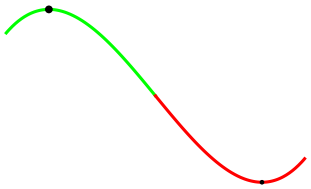
5) The function is differentiable for all points except for x=2 and x=4.

Software en Matemáticas - Derivación - 2019/2020
Relación-Derivación para para el dni: 26517849

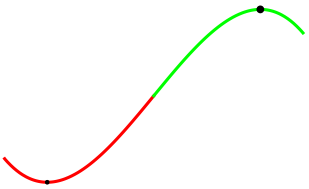
Exercise 1

Study the shape properties of the $f(x) = 2 - 48x + 48x^2 - 20x^3 + 3x^4$
to decide which amongst the following ones is the representation of the function.

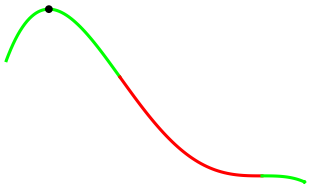
1)



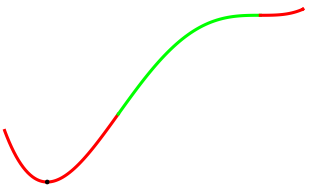
2)



3)



4)



● Big point: maximum

• Small point: minimum

Red line: convexity

Green line: concavity

Indication: To find the maximun and minimum points of the function,
try (with Ruffini) the points −2, −1, 0, 1, 2. To solve this exercise
it is necessary to determine the increasing and decreasing intervals.

Exercise 2

Determine the derivative of the function $f(t) =$
$\log(t+1)\left(\sin(t) - 2e^t\right)$ and compute its value at the point t=0.

1) $f'(0) = -2$ 2) $f'(0) = 3$ 3) $f'(0) = 0$ 4) $f'(0) = -1$

Exercise 3

Compute the limit: $\lim_{x \to 0} \frac{-x + \frac{x^3}{6} + \text{Sin}[x]}{x^4}$

1) -1

2) 0

3) $-\frac{1}{3}$

4) ∞

5) $-\frac{2}{3}$

6) $-\infty$

7) 1

Exercise 4

Compute the limit: $\lim_{x \to 1} \frac{-1 + x^2}{-2 + x + x^2}$

1) 0

2) -1

3) $-\frac{2}{3}$

4) $\frac{2}{3}$

5) $-\infty$

6) 1

7) ∞

Exercise 5

Between the months $t=1$ and $t=8$, the funds in certain account (in millions of euros) are given by the function $F(t) = -8 + 252\,t - 39\,t^2 + 2\,t^3$.

Determine the interval where the temperature oscillates between the months $t=2$ and $t=3$.

1) It oscillates between 207 and 536.

2) It oscillates between 531 and 532.

3) It oscillates between 356 and 451.

4) It oscillates between 358 and 458.

5) It oscillates between 352 and 448.

Exercise 6

In a fish farm, data of precedings years reveal that, if the initial number of fishes is x (x in thousands), after one month they reproduce until a number of $f(x)=\frac{27\,x}{12+50\,x}$ fishes.

What number of fishes leads to the largest increase in the number of animals, $f(x)-x$?

1) 3

2) $\frac{5}{3}$

3) $\frac{40}{19}$

4) $\frac{3}{25}$

5) $\frac{3}{13}$

Exercise 7

The yield of a tree plantation is given by $f(x)=\frac{-12+7\,x+12\,x^2}{26\,x^2}$, where x is the distance in meters between two trees.

What is the distance x that leads to the largest yield.

1) 2

2) $\frac{24}{7}$

3) $\frac{35}{6}$

4) $\frac{11}{4}$

5) 2

Exercise 8

Study the differentiability of the function $f(x)=$

$$\begin{cases} \sin(x+1)+\cos(x+1)+3 & x\le -1 \\ 3\,x-2\sin(x+1)+\cos(x+1)+6 & -1<x<1 \\ x\,(\log(x)-1)+10-2\sin(2)+\cos(2) & 1\le x \end{cases}$$

1) The function is differentiable for all points.

2) The function is not differentiable at any point.

3) The function is differentiable for all points except for x=−1.

4) The function is differentiable for all points except for x=1.

5) The function is differentiable for all points except for x=−1 and x=1.

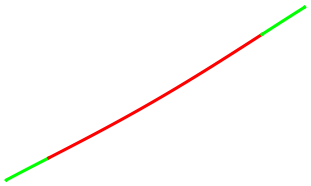
Software en Matemáticas - Derivación - 2019/2020
Relación-Derivación para para el dni: 77365004

Exercise 1

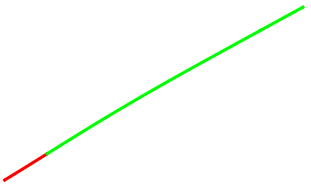
Study the shape properties of $f(x)=5+6x^2+3x^3+\frac{x^4}{2}$

to decide which amongst the following ones is the representation of the function.

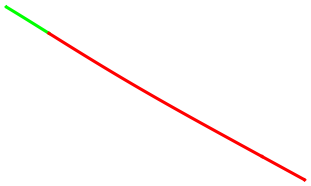
1)



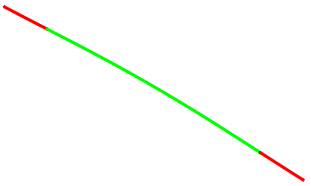
2)



3)



4)



● Big point: maximum

• Small point: minimum

Red line: convexity

Green line: concavity

Indication: To solve this exercise it is necessary to determine the concavity and convexity interval. To find the inflexion points separating the cancavity and convexity intervals, check (by means of Ruffini) with the points −2, −1, 0, 1, 2.

Exercise 2

Determine the derivative of the function $f(t)=-3\log(t+1)\cos(\cos(\cos(t)))$ and compute its value at the point t=0.

1) f'(0)=−3 2) f'(0)=3 3) f'(0)=1 4) f'(0)=−3 Cos[Cos[1]]

Exercise 3

Compute the limit: $\lim_{x \to 0} \frac{-1 + e^{x^3} - x^3}{x^6}$

1) $\frac{1}{2}$

2) 0

3) ∞

4) -2

5) $-\infty$

6) -1

7) 1

Exercise 4

Compute the limit: $\lim_{x \to -3} \frac{18 + 21\,x + 8\,x^2 + x^3}{3\,x + x^2}$

1) 0

2) $-\infty$

3) ∞

4) -1

5) $-\frac{1}{2}$

6) -2

7) 1

Exercise 5

Between the months t=2 and t=6
, the true value of the shares of a company (in euros) are given by the function $C(t) = 13 + 48\,t - 18\,t^2 + 2\,t^3$.

Determine the interval where the value oscillates between the months t=4 and t=6.

1) It oscillates between 55 and 87.

2) It oscillates between 36 and 78.

3) It oscillates between 49 and 86.

4) It oscillates between 45 and 53.

5) It oscillates between 45 and 85.

Exercise 6

In a fish farm, data of precedings years reveal that, if the initial number of fishes is x (x in thousands), after one month they reproduce until a number of $f(x)=\frac{50\,x}{18+49\,x}$ fishes.

What number of fishes leads to the largest increase in the number of animals, $f(x)-x$?

1) $\frac{12}{49}$

2) $\frac{11}{2}$

3) $\frac{3}{17}$

4) $\frac{35}{3}$

5) $\frac{35}{13}$

Exercise 7

The yield of a tree plantation is given by $f(x)=\frac{-27+9\,x+48\,x^2}{27\,x^3}$, where x is the distance in meters between two trees.

What is the distance x that leads to the largest yield.

1) $\frac{9}{8}$

2) $\frac{13}{7}$

3) 34

4) $\frac{8}{13}$

5) 6

Exercise 8

Study the differentiability of the function $f(x)=\begin{cases} -e^{x+3}-\cos(x+3)-1 & x\le -3 \\ \frac{1}{2}\,(x\,(x+4)-3) & -3<x<-2 \\ -\cos(x+2)-\frac{5}{2} & -2\le x \end{cases}$

1) The function is differentiable for all points.

2) The function is not differentiable at any point.

3) The function is differentiable for all points except for $x=-3$.

4) The function is differentiable for all points except for $x=-2$.

5) The function is differentiable for all points except for $x=-3$ and $x=-2$.