Ejercicios de cálculo de derivadas

IES O Couto

curso 2019-2020

Calcula las siguientes derivadas

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2. $y = \cos(2x-1)$
3. $y = \ln\left(x^2 - 6x\right)$
4. $y = \sqrt{x^3 - 4x + 1}$
5. $y = \operatorname{tg}(x^2 - x + 2)$
6. $y = (x^4 - 6x + 1)^6$
7. $y = \operatorname{sen}(x+1) \cdot \cos(x)$
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Del 1 al 10

Del 11 al 20

Del 21 al 30

Del 31 al 40

Del 41 al 50

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18. $y = \sqrt{\dfrac{x^3-1}{x^2+2}} \Longrightarrow y' = \dfrac{1}{2}\sqrt{\dfrac{x^2+2}{x^3-1}} \cdot \dfrac{x^4 + 6x^2 + 2x}{(x^2+2)^2}$

19. $y = (2x-1)e^{x^2-x} \Longrightarrow y' = \left[2 + (2x-1)^2\right] e^{x^2-x}$

20. $y = \operatorname{tg}^2(1+x^2)$

(*) No se trata de un cociente: $y = \dfrac{1}{6}\operatorname{sen}^3(x) - \dfrac{1}{6}\cos^2(x)$

Calcula las siguientes derivadas

11. $y = \sqrt[3]{x^4 - 2x^2 - 1} \Longrightarrow y' = \dfrac{4x^3 - 4x}{3\sqrt[3]{(x^4 - 2x^2 - 1)^2}}$

12. $y = \ln\left(\dfrac{x^2+1}{x+1}\right) \Longrightarrow y' = \dfrac{x^2 + 2x - 1}{(x+1)(x^2+1)}$

13. $y = \operatorname{sen}^3(2x)\cdot\cos(x) \Longrightarrow y' = 6\operatorname{sen}^2(2x)\cos(2x)\cos(x) - \operatorname{sen}^3(2x)\operatorname{sen}(x)$

14. $y = e^{-\sqrt{x^2-x}} \Longrightarrow y' = -\dfrac{(2x-1)e^{-\sqrt{x^2-x}}}{2\sqrt{x^2-x}}$

15. $y = (x^2+1)\ln\left(\dfrac{x^2+1}{x-1}\right) \Longrightarrow y' = 2x\ln\left(\dfrac{x^2+1}{x-1}\right) + \dfrac{x^2-2x-1}{x-1}$

16. $y = x\operatorname{sen}(x)\cos^2(x) \Rightarrow y' = \operatorname{sen}(x)\cos^2(x) + x\cos^3(x) - 2x\operatorname{sen}^2(x)\cos(x)$

17. $y = \dfrac{\operatorname{sen}^3(x) - \cos^2(3x)}{6} \Longrightarrow y' \overset{*}{=} \dfrac{\operatorname{sen}^2(x)\cos(x)}{2} + \cos(3x)\operatorname{sen}(3x)$

18. $y = \sqrt{\dfrac{x^3-1}{x^2+2}} \Longrightarrow y' = \dfrac{1}{2}\sqrt{\dfrac{x^2+2}{x^3-1}}\cdot\dfrac{x^4+6x^2+2x}{(x^2+2)^2}$

19. $y = (2x-1)e^{x^2-x} \Longrightarrow y' = \left[2 + (2x-1)^2\right]e^{x^2-x}$

20. $y = \operatorname{tg}^2(1+x^2) \Longrightarrow y' = 4x\operatorname{tg}(1+x^2)\left(1 + \operatorname{tg}(1+x^2)\right)$

(*) No se trata de un cociente: $y = \dfrac{1}{6}\operatorname{sen}^3(x) - \dfrac{1}{6}\cos^2(x)$

Calcula las siguientes derivadas

21. $y = x(x^2 + 3x^4)^6$
22. $y = \dfrac{1}{1 - e^{5x^4 - 3}}$
23. $y = \dfrac{e^x + 1}{e^x - 1}$
24. $y = \cos^2(x^4)$
25. $y = \dfrac{1}{\sqrt{4x^3 + 1}}$
26. $y = e^{6x}\operatorname{sen}^3(x)$
27. $y = (4x^2 - x)\sqrt{2x + 1}$
28. $y = \operatorname{sen}\left(\dfrac{x + 1}{2x - 3}\right)$
29. $y = e^{\operatorname{tg}(2x)}$
30. $y = \ln(1 + \operatorname{tg}(x))$

Calcula las siguientes derivadas

21. $y = x(x^2+3x^4)^6 \implies y' = (x^2+3x^4)^6 + 6x(x^2+3x^4)^5(2x+12x^3)$
22. $y = \dfrac{1}{1-e^{5x^4-3}}$
23. $y = \dfrac{e^x+1}{e^x-1}$
24. $y = \cos^2(x^4)$
25. $y = \dfrac{1}{\sqrt{4x^3+1}}$
26. $y = e^{6x}\operatorname{sen}^3(x)$
27. $y = (4x^2-x)\sqrt{2x+1}$
28. $y = \operatorname{sen}\left(\dfrac{x+1}{2x-3}\right)$
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Calcula las siguientes derivadas

21. $y = x(x^2+3x^4)^6 \implies y' = (x^2+3x^4)^6 + 6x(x^2+3x^4)^5(2x+12x^3)$
22. $y = \dfrac{1}{1-e^{5x^4-3}} \implies y' = \dfrac{20x^3 e^{5x^4-3}}{(1-e^{5x^4-3})^2}$
23. $y = \dfrac{e^x+1}{e^x-1}$
24. $y = \cos^2(x^4)$
25. $y = \dfrac{1}{\sqrt{4x^3+1}}$
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28. $y = \operatorname{sen}\left(\dfrac{x+1}{2x-3}\right)$
29. $y = e^{\operatorname{tg}(2x)}$
30. $y = \ln(1+\operatorname{tg}(x))$

Del 1 al 10

Del 11 al 20

Del 21 al 30

Del 31 al 40

Del 41 al 50

Calcula las siguientes derivadas

21. $y = x(x^2 + 3x^4)^6 \implies y' = (x^2 + 3x^4)^6 + 6x(x^2 + 3x^4)^5(2x + 12x^3)$
22. $y = \dfrac{1}{1 - e^{5x^4 - 3}} \implies y' = \dfrac{20x^3 e^{5x^4 - 3}}{(1 - e^{5x^4 - 3})^2}$
23. $y = \dfrac{e^x + 1}{e^x - 1} \implies y' = -\dfrac{2e^x}{(e^x - 1)^2}$
24. $y = \cos^2(x^4)$
25. $y = \dfrac{1}{\sqrt{4x^3 + 1}}$
26. $y = e^{6x} \operatorname{sen}^3(x)$
27. $y = (4x^2 - x)\sqrt{2x + 1}$
28. $y = \operatorname{sen}\left(\dfrac{x + 1}{2x - 3}\right)$
29. $y = e^{\operatorname{tg}(2x)}$
30. $y = \ln(1 + \operatorname{tg}(x))$

Calcula las siguientes derivadas

21. $y = x(x^2+3x^4)^6 \implies y' = (x^2+3x^4)^6 + 6x(x^2+3x^4)^5(2x+12x^3)$
22. $y = \dfrac{1}{1-e^{5x^4-3}} \implies y' = \dfrac{20x^3e^{5x^4-3}}{(1-e^{5x^4-3})^2}$
23. $y = \dfrac{e^x+1}{e^x-1} \implies y' = -\dfrac{2e^x}{(e^x-1)^2}$
24. $y = \cos^2(x^4) \implies y' = -8x^3\cos(x^4)\operatorname{sen}(x^4)$
25. $y = \dfrac{1}{\sqrt{4x^3+1}}$
26. $y = e^{6x}\operatorname{sen}^3(x)$
27. $y = (4x^2-x)\sqrt{2x+1}$
28. $y = \operatorname{sen}\left(\dfrac{x+1}{2x-3}\right)$
29. $y = e^{\operatorname{tg}(2x)}$
30. $y = \ln(1+\operatorname{tg}(x))$

Calcula las siguientes derivadas

21. $y = x(x^2+3x^4)^6 \implies y' = (x^2+3x^4)^6 + 6x(x^2+3x^4)^5(2x+12x^3)$
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23. $y = \dfrac{e^x+1}{e^x-1} \implies y' = -\dfrac{2e^x}{(e^x-1)^2}$
24. $y = \cos^2(x^4) \implies y' = -8x^3\cos(x^4)\,\mathrm{sen}(x^4)$
25. $y = \dfrac{1}{\sqrt{4x^3+1}} \implies y' \overset{*}{=} -6x^2\left(4x^3+1\right)^{-\frac{3}{2}}$
26. $y = e^{6x}\,\mathrm{sen}^3(x)$
27. $y = (4x^2-x)\sqrt{2x+1}$
28. $y = \mathrm{sen}\left(\dfrac{x+1}{2x-3}\right)$
29. $y = e^{\mathrm{tg}(2x)}$
30. $y = \ln(1+\mathrm{tg}(x))$

(*) Compensa derivar la expresión: $y = (4x^3+1)^{-1/2}$

Calcula las siguientes derivadas

21. $y = x(x^2+3x^4)^6 \implies y' = (x^2+3x^4)^6 + 6x(x^2+3x^4)^5(2x+12x^3)$
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25. $y = \dfrac{1}{\sqrt{4x^3+1}} \implies y' \overset{*}{=} -6x^2\left(4x^3+1\right)^{-\frac{3}{2}}$
26. $y = e^{6x}\,\mathrm{sen}^3(x) \implies y' = 6e^{6x}\,\mathrm{sen}^3(x) + e^{6x}3\,\mathrm{sen}^2(x)\cos(x)$
27. $y = (4x^2-x)\sqrt{2x+1}$
28. $y = \mathrm{sen}\left(\dfrac{x+1}{2x-3}\right)$
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23. $y = \dfrac{e^x+1}{e^x-1} \implies y' = -\dfrac{2e^x}{(e^x-1)^2}$
24. $y = \cos^2(x^4) \implies y' = -8x^3\cos(x^4)\operatorname{sen}(x^4)$
25. $y = \dfrac{1}{\sqrt{4x^3+1}} \implies y' \overset{*}{=} -6x^2\left(4x^3+1\right)^{-\frac{3}{2}}$
26. $y = e^{6x}\operatorname{sen}^3(x) \implies y' = 6e^{6x}\operatorname{sen}^3(x) + e^{6x}3\operatorname{sen}^2(x)\cos(x)$
27. $y = (4x^2-x)\sqrt{2x+1} \implies y' = (8x-1)\sqrt{2x+1} + \dfrac{4x^2-x}{2\sqrt{2x+1}}$
28. $y = \operatorname{sen}\left(\dfrac{x+1}{2x-3}\right)$
29. $y = e^{\operatorname{tg}(2x)}$
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26. $y = e^{6x}\operatorname{sen}^3(x) \implies y' = 6e^{6x}\operatorname{sen}^3(x) + e^{6x}3\operatorname{sen}^2(x)\cos(x)$
27. $y = (4x^2-x)\sqrt{2x+1} \implies y' = (8x-1)\sqrt{2x+1} + \dfrac{4x^2-x}{2\sqrt{2x+1}}$
28. $y = \operatorname{sen}\left(\dfrac{x+1}{2x-3}\right) \implies y' = -\dfrac{5}{(2x-3)^2}\cos\left(\dfrac{x+1}{2x-3}\right)$
29. $y = e^{\operatorname{tg}(2x)}$
30. $y = \ln(1+\operatorname{tg}(x))$

(*) Compensa derivar la expresión: $y = (4x^3+1)^{-1/2}$

Calcula las siguientes derivadas

21. $y = x(x^2+3x^4)^6 \implies y' = (x^2+3x^4)^6 + 6x(x^2+3x^4)^5(2x+12x^3)$

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23. $y = \dfrac{e^x+1}{e^x-1} \implies y' = -\dfrac{2e^x}{(e^x-1)^2}$

24. $y = \cos^2(x^4) \implies y' = -8x^3\cos(x^4)\,\mathrm{sen}(x^4)$

25. $y = \dfrac{1}{\sqrt{4x^3+1}} \implies y' \overset{*}{=} -6x^2\left(4x^3+1\right)^{-\frac{3}{2}}$

26. $y = e^{6x}\,\mathrm{sen}^3(x) \implies y' = 6e^{6x}\,\mathrm{sen}^3(x) + e^{6x}3\,\mathrm{sen}^2(x)\cos(x)$

27. $y = (4x^2-x)\sqrt{2x+1} \implies y' = (8x-1)\sqrt{2x+1} + \dfrac{4x^2-x}{2\sqrt{2x+1}}$

28. $y = \mathrm{sen}\left(\dfrac{x+1}{2x-3}\right) \implies y' = -\dfrac{5}{(2x-3)^2}\cos\left(\dfrac{x+1}{2x-3}\right)$

29. $y = e^{\mathrm{tg}(2x)} \implies y' = 2\left(1+\mathrm{tg}^2(2x)\right)e^{\mathrm{tg}(2x)}$

30. $y = \ln(1+\mathrm{tg}(x))$

(*) Compensa derivar la expresión: $y = (4x^3+1)^{-1/2}$

Calcula las siguientes derivadas

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29. $y = e^{\operatorname{tg}(2x)} \Longrightarrow y' = 2\left(1+\operatorname{tg}^2(2x)\right)e^{\operatorname{tg}(2x)}$

30. $y = \ln(1+\operatorname{tg}(x)) \Longrightarrow y' = \dfrac{1+\operatorname{tg}^2(x)}{1+\operatorname{tg}(x)}$

(*) Compensa derivar la expresión: $y = (4x^3+1)^{-1/2}$

Calcula las siguientes derivadas

31. $y = \sqrt{1 + 2\cos(x)}$
32. $y = \text{sen}(x)(1-\cos(x))^5$
33. $y = \dfrac{1}{(x^2 + x + 1)^5}$
34. $y = \ln(1 + e^{-x})\,\text{sen}(x)$
35. $y = \dfrac{x}{1 + \ln(x)}$
36. $y = \dfrac{\sqrt{x}}{1 - \sqrt{x}}$
37. $y = \dfrac{x^2 e^{-x}}{1 + e^x}$
38. $y = \sqrt{x + \text{tg}(x)}$
39. $y = \dfrac{(2x^3 + x - 1)^6}{3}$
40. $y = e^{\text{sen}^2(x)}$

Calcula las siguientes derivadas

31. $y = \sqrt{1 + 2\cos(x)} \Longrightarrow y' = -\dfrac{\operatorname{sen}(x)}{\sqrt{1 + 2\cos(x)}}$
32. $y = \operatorname{sen}(x)(1 - \cos(x))^5$
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37. $y = \dfrac{x^2 e^{-x}}{1 + e^x}$
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39. $y = \dfrac{(2x^3 + x - 1)^6}{3}$
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Calcula las siguientes derivadas

31. $y = \sqrt{1 + 2\cos(x)} \Longrightarrow y' = -\dfrac{\operatorname{sen}(x)}{\sqrt{1 + 2\cos(x)}}$
32. $y = \operatorname{sen}(x)(1 - \cos(x))^5 \Rightarrow y' = \cos(x)(1 - \cos(x))^5 + 5\operatorname{sen}^2(x)(1 - \cos(x))^4$
33. $y = \dfrac{1}{(x^2 + x + 1)^5}$
34. $y = \ln(1 + e^{-x})\operatorname{sen}(x)$
35. $y = \dfrac{x}{1 + \ln(x)}$
36. $y = \dfrac{\sqrt{x}}{1 - \sqrt{x}}$
37. $y = \dfrac{x^2 e^{-x}}{1 + e^x}$
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33. $y = \dfrac{1}{(x^2+x+1)^5} \Longrightarrow y' \overset{*}{=} -\dfrac{5(2x+1)}{(x^2+x+1)^4}$
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35. $y = \dfrac{x}{1+\ln(x)}$
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39. $y = \dfrac{(2x^3+x-1)^6}{3}$
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(*) Compensa derivar como una potencia la expresión: $y = (x^2+x+1)^{-5}$

Calcula las siguientes derivadas

31. $y = \sqrt{1+2\cos(x)} \Longrightarrow y' = -\dfrac{\operatorname{sen}(x)}{\sqrt{1+2\cos(x)}}$

32. $y = \operatorname{sen}(x)(1-\cos(x))^5 \Rightarrow y' = \cos(x)(1-\cos(x))^5 + 5\operatorname{sen}^2(x)(1-\cos(x))^4$

33. $y = \dfrac{1}{(x^2+x+1)^5} \Longrightarrow y' \overset{*}{=} -\dfrac{5(2x+1)}{(x^2+x+1)^4}$

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35. $y = \dfrac{x}{1+\ln(x)} \Longrightarrow y' = \dfrac{\ln(x)}{(1+\ln(x))^2}$

36. $y = \dfrac{\sqrt{x}}{1-\sqrt{x}} \Longrightarrow y' = \dfrac{1}{2\sqrt{x}\,(1-\sqrt{x})^2}$

37. $y = \dfrac{x^2 e^{-x}}{1+e^x}$

38. $y = \sqrt{x+\operatorname{tg}(x)}$

39. $y = \dfrac{(2x^3+x-1)^6}{3}$

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34. $y = \ln(1+e^{-x})\operatorname{sen}(x) \Longrightarrow y' = -\dfrac{e^{-x}}{1+e^{-x}} \cdot \operatorname{sen}(x) - \ln(1+e^{-x})\cos(x)$

35. $y = \dfrac{x}{1+\ln(x)} \Longrightarrow y' = \dfrac{\ln(x)}{(1+\ln(x))^2}$

36. $y = \dfrac{\sqrt{x}}{1-\sqrt{x}} \Longrightarrow y' = \dfrac{1}{2\sqrt{x}\,(1-\sqrt{x})^2}$

37. $y = \dfrac{x^2 e^{-x}}{1+e^x} \Longrightarrow y' = \dfrac{(2x-x^2)e^{-x}+2x-2x^2}{(1+e^x)^2}$

38. $y = \sqrt{x+\operatorname{tg}(x)}$

39. $y = \dfrac{(2x^3+x-1)^6}{3}$

40. $y = e^{\operatorname{sen}^2(x)}$

(*) Compensa derivar como una potencia la expresión: $y = (x^2+x+1)^{-5}$

Calcula las siguientes derivadas

31. $y = \sqrt{1 + 2\cos(x)} \Longrightarrow y' = -\dfrac{\operatorname{sen}(x)}{\sqrt{1 + 2\cos(x)}}$

32. $y = \operatorname{sen}(x)(1 - \cos(x))^5 \Rightarrow y' = \cos(x)(1 - \cos(x))^5 + 5\operatorname{sen}^2(x)(1 - \cos(x))^4$

33. $y = \dfrac{1}{(x^2 + x + 1)^5} \Longrightarrow y' \overset{*}{=} -\dfrac{5(2x + 1)}{(x^2 + x + 1)^4}$

34. $y = \ln(1 + e^{-x})\operatorname{sen}(x) \Longrightarrow y' = -\dfrac{e^{-x}}{1 + e^{-x}} \cdot \operatorname{sen}(x) - \ln(1 + e^{-x})\cos(x)$

35. $y = \dfrac{x}{1 + \ln(x)} \Longrightarrow y' = \dfrac{\ln(x)}{(1 + \ln(x))^2}$

36. $y = \dfrac{\sqrt{x}}{1 - \sqrt{x}} \Longrightarrow y' = \dfrac{1}{2\sqrt{x}\,(1 - \sqrt{x})^2}$

37. $y = \dfrac{x^2 e^{-x}}{1 + e^x} \Longrightarrow y' = \dfrac{(2x - x^2)e^{-x} + 2x - 2x^2}{(1 + e^x)^2}$

38. $y = \sqrt{x + \operatorname{tg}(x)} \Longrightarrow y' = \dfrac{2 + \operatorname{tg}^2(x)}{2\sqrt{x + \operatorname{tg}(x)}}$

39. $y = \dfrac{(2x^3 + x - 1)^6}{3}$

40. $y = e^{\operatorname{sen}^2(x)}$

(*) Compensa derivar como una potencia la expresión: $y = (x^2 + x + 1)^{-5}$

Calcula las siguientes derivadas

31. $y = \sqrt{1+2\cos(x)} \Longrightarrow y' = -\dfrac{\operatorname{sen}(x)}{\sqrt{1+2\cos(x)}}$

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Calcula las siguientes derivadas

41. $y = 3x^4 + x^2 + 1 + 3\sqrt{x} - \dfrac{1}{x}$
42. $y = \dfrac{x-1}{2x+3} + \dfrac{1}{x^2}$
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48. $y = (x - \cos(2x))^8$
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Calcula las siguientes derivadas

41. $y = 3x^4 + x^2 + 1 + 3\sqrt{x} - \dfrac{1}{x} \Longrightarrow y' = 12x^3 + 2x + \dfrac{3}{2\sqrt{x}} + \dfrac{1}{x^2}$
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Calcula las siguientes derivadas

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Del 1 al 10
Del 11 al 20
Del 21 al 30
Del 31 al 40
Del 41 al 50

Calcula las siguientes derivadas

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