G5. Derivate - Esercizi:

Calcola la derivata delle seguenti funzioni

1) $y=\text{sen}(\pi/2)$ $[y'=0]$
2) $y=5^x$ $[y'=5^x\cdot\ln5]$
3) $y=3x$ $[y'=3]$
4) $y=-\frac{1}{2}\text{senx}$ $[y'=-\frac{1}{2}\cos x]$
5) $y=e$ $[y'=0]$
6) $y=\frac{1}{3}\ln x$ $[y'=\frac{1}{3x}]$
7) $y=-\frac{1}{2}$ $[y'=0]$
8) $y=e^x-2\cdot\ln x$ $[y'=e^x-\frac{2}{x}]$
9) $y=2\pi$ $[y'=0]$
10) $y=\ln x$ $[y'=\frac{1}{x}]$
11) $y=-2e^x$ $[y'=-2e^x]$
12) $y=\log_3 x$ $[y'=\frac{1}{x}\log_3 e]$
13) $y=-2\log_a x$ $[y'=-\frac{2}{x}\log_a e]$
14) $y=3x-5\cdot\cos x$ $[y'=3+5\text{senx}]$
15) $y=3\cos x$ $[y'=-3\text{senx}]$
16) $y=5\cdot3^x$ $[y'=5\cdot3^x\cdot\ln3]$
17) $y=-x-2\ln x$ $[y'=-1-\frac{2}{x}]$
18) $y=4x+2\log x-2$ $[y'=4+\frac{2}{x}\log e]$
19) $y=\text{senx}+2\cos x$ $[y'=\cos x-2\text{senx}]$
20) $y=5^x+3^x-2$ $[y'=5^x\cdot\ln5+3^x\cdot\ln3]$
21) $y=3x+\ln x$ $[y'=3+\frac{1}{x}]$
22) $y=x^2\cdot e^x$ $[y'=e^x\cdot(2x+x^2)]$
23) $y=4^x+\log_4 x$ $[y'=4^x\cdot\ln4+\frac{1}{x}\log_4 e]$
24) $y=2\text{senx}\cos x$ $[y'=2(\cos^2x-\text{sen}^2x)]$
25) $y=2^x\cdot\text{senx}$ $[y'=2^x(\ln2\cdot\text{senx}+\cos x)]$
26) $y=5x^2-\frac{3}{x^3}$ $[y'=10x+\frac{9}{x^4}]$
27) $y=x^{\frac{1}{3}}$ $[y'=\frac{1}{3}x^{-\frac{2}{3}}]$
28) $y=(3x+2\ln x)\cdot\text{senx}$ $[y'=\left(3+\frac{2}{x}\right)\cdot\text{senx}+(3x+2\ln x)\cdot\cos x]$
29) $y=x^7$ $[y'=7x^6]$
30) $y=\frac{1}{x^3}-\frac{3}{x^4}$ $[y'=-\frac{3}{x^4}+\frac{12}{x^5}]$
31) $y=\frac{1}{\sqrt[3]{x^2}}$ $[y'=-\frac{2}{3x\cdot\sqrt[3]{x^2}}]$
32) $y=-\frac{1}{5}x^5$ $[y'=-x^4]$
33) $y=5x\cdot e^x\cdot\cos x$ $[y'=5e^x\cdot(\cos x+x\cos x-x\text{senx})]$
34) $y=5e^x\cdot\cos x$ $[y'=5e^x\cdot(\cos x-\text{senx})]$
35) $y=3x^5-2x^2+4$ $[y'=15x^4-4x]$
36) $y=\text{senx}-x\cdot\ln x$ $[y'=\cos x-\ln x-1]$
37) $y=(e^x+2x)\cdot\ln x$ $[y'=e^x\ln x+2\ln x+\frac{e^x}{x}+2]$

38)	$y=e^x \cdot \ln x$	$[\, y' = e^x \cdot \left(\ln x + \frac{1}{x}\right) \,]$
39)	$y=2x^2 \cdot tgx$	$[\, y' = 2x \cdot \left(2tgx + \frac{x}{\cos^2 x}\right) \,]$
40)	$y=5x^4-3x^3+2x^2+x$	$[y'=20x^3-9x^2+4x+1]$
41)	$y = -\frac{2}{x^2}$	$[\, y' = \frac{4}{x^3} \,]$
42)	$y = \sqrt[3]{x^4} - 2x^2 + 5x$	$[\, y' = \frac{4 \cdot \sqrt[3]{x}}{3} - 4x + 5 \,]$
43)	$y=-3x^3$	$[y'=-9x^2]$
44)	$y = \sqrt[4]{x}$	$[\, y' = \frac{1}{4 \cdot \sqrt[4]{x^3}} \,]$
45)	$y = \frac{1}{2}x^6 - \frac{1}{4}x^4 + x^2$	$[y'=3x^5-x^3+2x]$
46)	$y=-x^5$	$[y'=-5x^4]$
47)	$y = \frac{\sqrt{x}}{x}$	$[\, y' = -\frac{1}{2x \cdot \sqrt{x}} \,]$
48)	$y=2x^3+3x^2$	$[y'=6x^2+6x]$
49)	$y = \sqrt[5]{x^2} - 5x^2$	$[\, y' = \frac{2}{5 \cdot \sqrt[5]{x^3}} - 10x \,]$
50)	$y = 3\sqrt{x} - \frac{3}{x}$	$[\, y' = \frac{3}{2 \cdot \sqrt{x}} + \frac{3}{x^2} \,]$
51)	$y = \frac{x^2 - 2x + 3}{x^2 - 1}$	$[\, y' = \frac{2(x^2 - 4x + 1)}{(x^2 - 1)^2} \,]$
52)	$y = \frac{3}{x^3 - 1}$	$[\, y' = \frac{-9x^2}{(x^3 - 1)^2} \,]$
53)	$y = \sqrt[3]{3x^3 - 2x}$	$[\, y' = \frac{9x^2 - 2}{3 \cdot \sqrt[3]{(3x^3 - 2x)^2}} \,]$
54)	$y=\cos(x^4)$	$[y'=-4x^3 \cdot sen(x^4)]$
55)	$y=\cos^4 x$	$[y'=-4 senx \cos^3 x]$
56)	$y = \frac{5}{(1 - 2x)^2}$	$[\, y' = \frac{20}{(1 - 2x)^3} \,]$
57)	$y=(x^2-x)^2$	$[y'=2x(x-1)(2x-1)]$
58)	$y = \frac{\sqrt{x^2 + 1}}{e^x}$	$[\, y' = \frac{-x^2 + x - 1}{e^x \cdot \sqrt{x^2 + 1}} \,]$
59)	$y = \frac{2 - \ln x}{x}$	$[\, y' = \frac{-\ln x - 3}{x^2} \,]$
60)	$y=cotgx$	$[\, y' = -1 - cotg^2 x = -\frac{1}{sen^2 x} \,]$
61)	$y = \frac{\cos x - 1}{x^2}$	$[\, y' = \frac{-x senx - 2\cos x + 2}{x^3} \,]$
62)	$y=(x+2)^4$	$[y'=4 \cdot (x+2)^3]$
63)	$y=e^x+5x \cdot \ln x$	$[y'=e^x+5\ln x+5]$
64)	$y = \frac{1}{x^2 - 1}$	$[\, y' = \frac{-2x}{(x^2 - 1)^2} \,]$
65)	$y=(\ln x+1)^6$	$[\, y' = 6(\ln x + 1)^5 \cdot \frac{1}{x} \,]$
66)	$y = -\frac{1}{x^3} + 2\pi$	$[\, y' = \frac{3}{x^4} \,]$
67)	$y=x+\ln^2 x$	$[\, y' = 1 + \frac{2}{x}\ln x \,]$

68) $y=x+\ln(x^2)$ $[\, y' = 1+\frac{2}{x} \,]$

69) $y=x\cdot\ln^2 x$ $[y'=\ln^2 x+2\ln x]$

70) $y=x\cdot\ln(x^2)$ $[y'=\ln(x^2)+2]$

71) $y=\frac{2x-3}{x^2-1}$ $[\, y' = \frac{-2x^2+6x-2}{(x^2-1)^2} \,]$

72) $y=(2x^5-3)^2$ $[y'=20x^4(2x^5-3)]$

73) $y=\sqrt{x}\cdot \text{sen}^2 x$ $[\, y' = \frac{\text{sen}^2 x + 4x\,\text{sen}x\cos x}{2\cdot\sqrt{x}} \,]$

74) $y=(3x^2-1)^3$ $[y'=18x(3x^2-1)^2]$

75) $y=\sqrt[5]{x^2-1}$ $[\, y' = \frac{2x}{5\cdot\sqrt[5]{(x^2-1)^4}} \,]$

76) $y=\frac{x+1}{2x-1}$ $[\, y' = \frac{-3}{(2x-1)^2} \,]$

77) $y=\sqrt[4]{x^3+x^2+2x}$ $[\, y' = \frac{3x^2+2x+2}{4\cdot\sqrt[4]{(x^3+x^2+2x)^3}} \,]$

78) $y=\sqrt{x-3}$ $[\, y' = \frac{1}{2\cdot\sqrt{x-3}} \,]$

79) $y=(2+\cos x)^3$ $[y'=-3\,\text{sen}x(2+\cos x)^2]$

80) $y=\frac{x^2}{x^2-1}$ $[\, y' = \frac{-2x}{(x^2-1)^2} \,]$

81) $y=e^{\frac{x}{x^2-1}}$ $[\, y' = e^{\frac{x}{x^2-1}}\cdot\frac{-x^2-1}{(x^2-1)^2} \,]$

82) $y=\frac{2x+\text{sen}x}{\text{sen}x}$ $[\, y' = \frac{2(\text{sen}x - x\cos x)}{\text{sen}^2 x} \,]$

83) $y=\frac{x^3}{1-x^4}$ $[\, y' = \frac{x^6+3x^2}{(1-x^4)^2} \,]$

84) $y=\frac{x^2+1}{(x+1)^2}$ $[\, y' = \frac{2x-2}{(x+1)^3} \,]$

85) $y=\frac{x^3}{(x^2-1)^2}$ $[\, y' = \frac{-3x^2-x^4}{(x^2-1)^3} \,]$

86) $y=\frac{3x^4-2}{e^x}$ $[\, y' = \frac{-3x^4+12x^3+2}{e^x} \,]$

87) $y=\frac{x^4}{2x+3}$ $[\, y' = \frac{6x^4+12x^3}{(2x+3)^2} \,]$

88) $y=e^{\sqrt{x}}$ $[\, y' = \frac{e^{\sqrt{x}}}{2\cdot\sqrt{x}} \,]$

89) $y=\frac{\sqrt[4]{x^3}}{\sqrt{x}}$ $[\, y' = \frac{1}{4\cdot\sqrt[4]{x^3}} \,]$

90) $y=\frac{1}{\ln^3 x}$ $[\, y' = \frac{-3}{x\cdot\ln^4 x} \,]$

91) $y=\frac{3x-2}{x^3}$ $[\, y' = \frac{-6x+6}{x^4} \,]$

92) $y=\frac{\text{sen}x}{x}$ $[\, y' = \frac{x\cos x - \text{sen}x}{x^2} \,]$

93) $y=2\cdot 3^x+3$ $[y'=2\cdot 3^x\cdot\ln 3]$

94) $y=\ln(3x-1)$ $[\, y' = \frac{3}{3x-1} \,]$

95) $y=e^{x-2}$ $[y'=e^{x-2}]$

96) $y=\sqrt{\text{tg}x}$ $[\, y' = \frac{1+\text{tg}^2 x}{2\cdot\sqrt{\text{tg}x}} \,]$

97) $y = \frac{\ln x}{\operatorname{tg} x}$ [$y' = \frac{\operatorname{tg}x - x \cdot \ln x - x \cdot \ln x \cdot \operatorname{tg}^2 x}{x \cdot \operatorname{tg}^2 x}$]

98) $y=\operatorname{tg}^2 x$ [$y'=2\operatorname{tg}x(1+\operatorname{tg}^2 x)$]

99) $y = \frac{x \cdot \operatorname{sen}x}{e^x}$ [$y' = \frac{\operatorname{sen}x + x\cos x - x\operatorname{sen}x}{e^x}$]

100) $y = \frac{\ln x}{x}$ [$y' = \frac{1 - \ln x}{x^2}$]

Risolvere i limiti seguenti utilizzando la regola di De L'Hôpital.

101) $\lim_{x\to\infty} \frac{x^2 - 2x}{3x}$ [∞]

102) $\lim_{x\to\infty} \frac{2 - x^2}{x^2}$ [-1]

103) $\lim_{x\to\infty} \frac{5 - 3x}{2x}$ [$-\frac{3}{2}$]

104) $\lim_{x\to\infty} \frac{2x - 1}{x^2 - 1}$ [0]

105) $\lim_{x\to\infty} \frac{x^2 + 3x + 4}{x^4 - x^2}$ [0]

106) $\lim_{x\to\infty} \frac{x^2 - 8x^3}{x^2}$ [∞]

107) $\lim_{x\to 1} \frac{x - 1}{x^3 - 1}$ [$\frac{1}{3}$]

108) $\lim_{x\to 2} \frac{x - 2}{\sqrt{x} - \sqrt{2}}$ [$2 \cdot \sqrt{2}$]

109) $\lim_{x\to -1} \frac{1 + x}{x^2 + 1 + 2x}$ [∞]

110) $\lim_{x\to 3} \frac{x^2 - 6x + 9}{x^2 - 5x + 6}$ [0]

111) $\lim_{x\to -2} \frac{x^2 + 6x + 8}{x^2 - 4}$ [$-\frac{1}{2}$]

112) $\lim_{x\to\infty} \frac{e^x + x^2}{x^2 - x}$ [∞]

113) $\lim_{x\to\infty} \frac{3e^x - x}{2x - e^x}$ [-3]

114) $\lim_{x\to\infty} \frac{2^x}{\ln x}$ [∞]

115) $\lim_{x\to 0} \frac{e^x - 1}{x}$ [1]

116) $\lim_{x\to 0} \frac{\operatorname{sen}x}{x}$ [1]

117) $\lim_{x\to 0} \frac{x^2}{1 - \cos x}$ [2]

118) $\lim_{x\to 0} \frac{\operatorname{tg}x}{x^2}$ [∞]

119) $\lim_{x\to 1} \frac{\ln x}{x - 1}$ [1]

120) $\lim_{x\to 2} \frac{\ln(x - 1)}{\operatorname{sen}(x - 2)}$ [1]

121) $\lim_{x\to -2} \frac{3e^{x+2} - 3}{x^2 - 4}$ [$-\frac{3}{4}$]

122) $\lim_{x \to -\infty} \frac{1 - x^2}{x}$ [+∞]

123) $\lim_{x \to 0} \frac{e^x - 1}{\cos^2 x - 1}$ [∞]

124) $\lim_{x \to 0} \frac{1 - \cos^2 x}{x^2}$ [1]

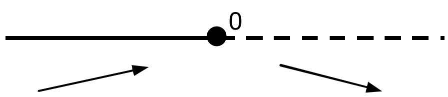
125) $\lim_{x \to 1} \frac{\cos x - \cos 1}{x - 1}$ [-sen1]

Trova l'equazione della retta tangente alla funzione data passante per il punto di ascissa indicata.

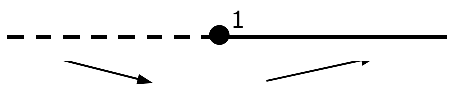
126) $y=x^2-2x+1$ $x_0=2$ [$y=2x-3$]
127) $y=x^3+3x^2$ $x_0=-1$ [$y=-3x-1$]
128) $y=x^3-2x+1$ $x_0=0$ [$y=-2x+1$]
129) $y = \frac{1}{3}x^3 - \frac{1}{2}x^2 + x$ $x_0=1$ [$y = x - \frac{1}{6}$]
130) $y = \frac{x^2 - 3x}{x - 1}$ $x_0=2$ [$y=3x-8$]
131) $y = \frac{x^2 - x + 1}{x^2 - 1}$ $x_0=0$ [$y=x-1$]
132) $y = \sqrt{2x^2 - 2}$ $x_0=1$ [$x=1$]
133) $y = \frac{4 - x^2}{x}$ $x_0=-1$ [$y=-5x-8$]
134) $y = -\frac{2}{x}$ $x_0=\frac{1}{2}$ [$y=8x-8$]
135) $y=4x^2-6x+9$ $x_0=1$ [$y=2x+5$]
136) $y=e^{3x}-1$ $x_0=0$ [$y=3x$]
137) $y=x^2 \cdot \ln x$ $x_0=1$ [$y=x-1$]
138) $y = \frac{1}{2}\sqrt{x^2 - 1}$ $x_0=\sqrt{2}$ [$y = \frac{\sqrt{2}}{2}x - \frac{1}{2}$]
139) $y=2x+e^{x-1}$ $x_0=1$ [$y=3x$]
140) $y=-x^2+4x$ $x_0=3$ [$y=-2x+9$]

Studia la derivata prima delle seguenti funzioni.

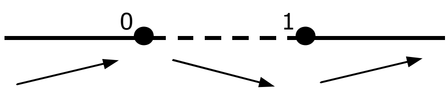
141) $y=2-x^2$ massimo (0;2)



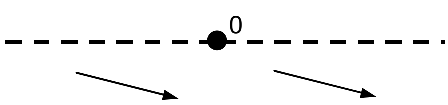
142) $y=2x^2-4x$ minimo (1;-2)



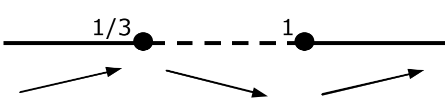
143) $y=2x^3-3x^2$ massimo (0;0)
minimo (1;-1)



144) $y=-x^3$ flesso disc. a tg orizz.le (0;0)

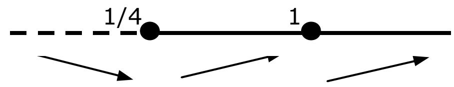


145) $y=x \cdot (x-1)^2$ massimo $\left(\frac{1}{3}; \frac{4}{27}\right)$
minimo (1;0)



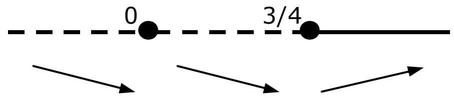
146) $y=x\cdot(x-1)^3$

minimo $\left(\frac{1}{4};-\frac{27}{256}\right)$
flesso asc. a tg orizz.le (1;0)



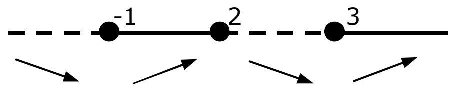
147) $y=x^4-x^3$

minimo $\left(\frac{3}{4};-\frac{27}{256}\right)$
flesso disc. a tg orizz.le (0;0)



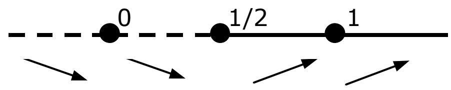
148) $y=\frac{x^4}{4}-4\frac{x^3}{3}+\frac{x^2}{2}+6x$

minimo $\left(-1;-\frac{47}{12}\right)$
massimo $\left(2;\frac{22}{3}\right)$
minimo $\left(3;\frac{27}{4}\right)$



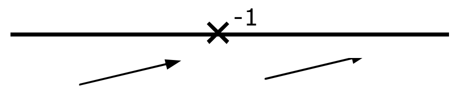
149) $y=x^3\cdot(x-1)^3$

flesso disc. a tg orizz.le (0;0)
minimo $\left(\frac{1}{2};-\frac{1}{64}\right)$
flesso asc. a tg orizz. (1;0)



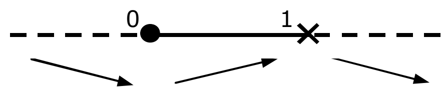
150) $y=\frac{x-1}{x+1}$

nè max, nè min, nè flessi



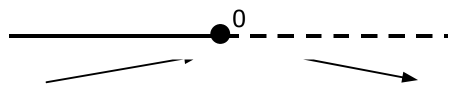
151) $y=\frac{x^2}{(x-1)^2}$

minimo (0;0)



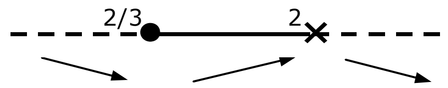
152) $y=\frac{2}{x^2+1}$

massimo (0;2)



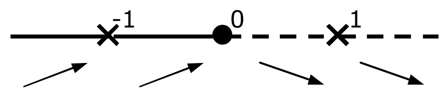
153) $y=\frac{x^2-x}{x^2-4x+4}$

minimo $\left(\frac{2}{3};-\frac{1}{8}\right)$



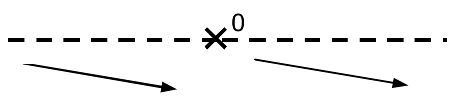
154) $y=\frac{2}{x^2-1}$

massimo (0;-2)



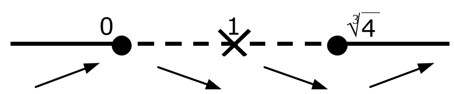
155) $y=\frac{-3}{x^2}$

nè max, nè min, nè flessi

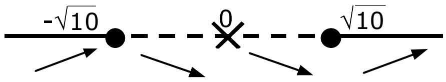


156) $y=\frac{x^4}{x^3-1}$

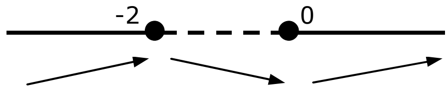
minimo $\left(\sqrt[3]{4};\frac{4\cdot\sqrt[3]{4}}{3}\right)$
massimo (0;0)



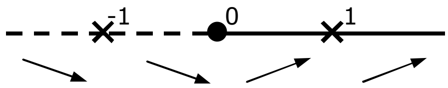
157) $y = \frac{x^2 - 7x + 10}{x}$ massimo $\left(-\sqrt{10}; -2\sqrt{10} - 7\right)$ minimo $\left(\sqrt{10}; 2\sqrt{10} - 7\right)$



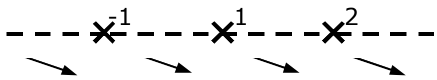
158) $y = \frac{x^2}{1 + x + x^2}$ minimo (0;0) massimo $\left(-2; \frac{4}{3}\right)$



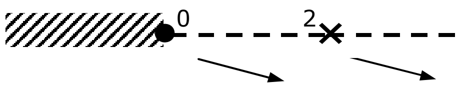
159) $y = \frac{x^2 - 4}{x^2 - 1}$ minimo (0;4)



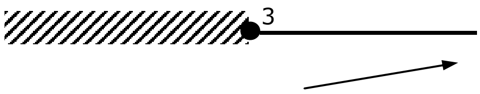
160) $y = \frac{x^2 - 1}{x^3 - 2x^2 - x + 2}$ nè max, nè min, nè flessi



161) $y = \frac{\sqrt{x} - \sqrt{2}}{x - 2}$ massimo $\left(0; \frac{\sqrt{2}}{2}\right)$



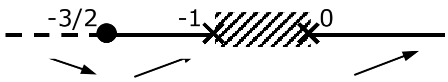
162) $y = \sqrt{x - 3}$ minimo (3;0)



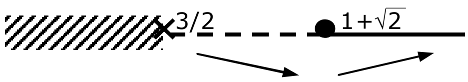
163) $y = \sqrt{x^2 - 1}$ minimo (-1;0) minimo (1;0)

164) $y = \frac{\sqrt{x^2 - 2x}}{x}$ minimo (2;0)

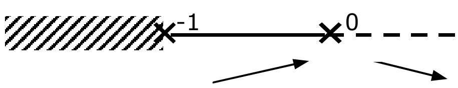
165) $y = \sqrt{\frac{x^3}{x+1}}$ minimo $\left(-\frac{3}{2}; \frac{3 \cdot \sqrt{3}}{2}\right)$



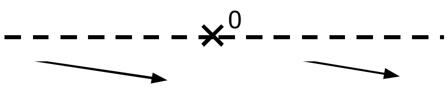
166) $y = \frac{x^2 + 3}{\sqrt{2x - 3}}$ minimo $\left(1 + \sqrt{2}; \frac{6 + 2\sqrt{2}}{\sqrt{2\sqrt{2} - 1}}\right)$



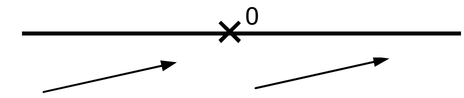
167) $y = \ln\left(\frac{x + 1}{x^2}\right)$ nè max, nè min, nè flessi



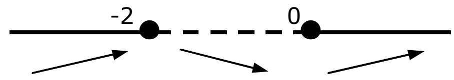
168) $y = \frac{e^x}{e^x - 1}$ nè max, nè min, nè flessi



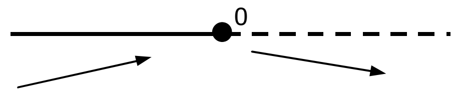
169) $y = \frac{e}{1 + e^{1/x}}$ nè max, nè min, nè flessi



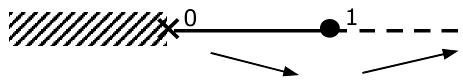
170) $y = x^2 \cdot e^x$ massimo $\left(-2; \frac{4}{e^2}\right)$
min (0;0)



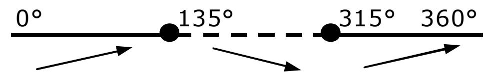
171) $y = e^{-x^2}$ massimo (0;1)



172) y=lnx-x massimo (1;-1)



173) y=senx-cosx massimo $\left(\frac{3}{4}\pi; \sqrt{2}\right)$
minimo $\left(\frac{7}{4}\pi; -\sqrt{2}\right)$

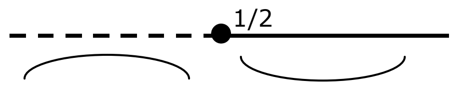


Studia la derivata seconda delle seguenti funzioni.

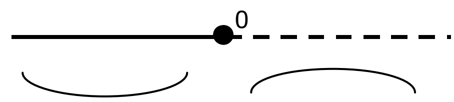
174) $y=2-x^2$ non ci sono flessi

175) $y=2x^2-4x$ non ci sono flessi

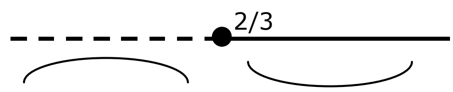
176) $y=2x^3-3x^2$ flesso $\left(\frac{1}{2}; -\frac{1}{2}\right)$



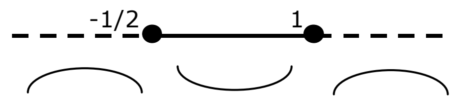
177) $y=-x^3$ flesso (0;0)



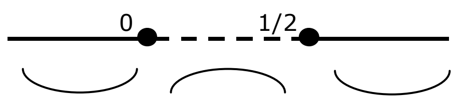
178) $y=x \cdot (x-1)^2$ flesso $\left(\frac{2}{3}; \frac{2}{27}\right)$



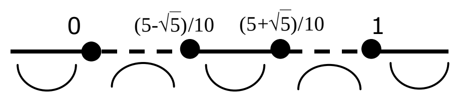
179) $y=x \cdot (x-1)^3$ flessi $\left(\frac{1}{2}; -\frac{1}{16}\right)$ (1;0)



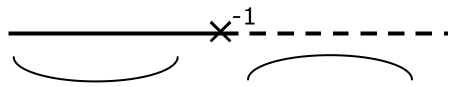
180) $y=x^4-x^3$ flessi (0;0) $\left(\frac{1}{2}; -\frac{1}{16}\right)$



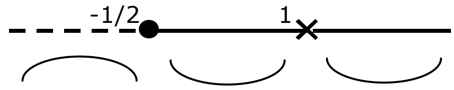
181) $y=x^3 \cdot (x-1)^3$ flessi (0;0) (1;0)
$\left(\frac{5-\sqrt{5}}{10}; \ldots\right)$ $\left(\frac{5+\sqrt{5}}{10}; \ldots\right)$



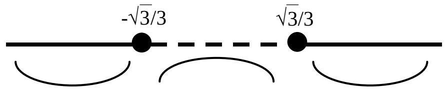
182) $y=\dfrac{x-1}{x+1}$ non ci sono flessi



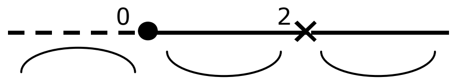
183) $y=\dfrac{x^2}{(x-1)^2}$ flesso $\left(-\dfrac{1}{2};\dfrac{1}{9}\right)$



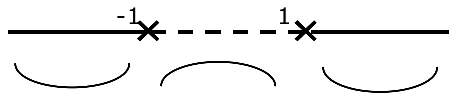
184) $y=\dfrac{2}{x^2+1}$ flessi $\left(\dfrac{-\sqrt{3}}{3};\dfrac{3}{2}\right)$ $\left(\dfrac{\sqrt{3}}{3};\dfrac{3}{2}\right)$



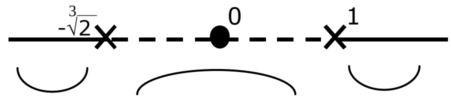
185) $y=\dfrac{x^2-x}{x^2-4x+4}$ flesso (0;0)



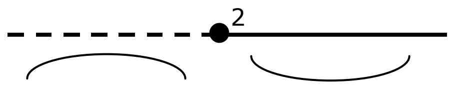
186) $y=\dfrac{2}{x^2-1}$ non ci sono flessi



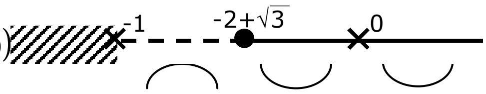
187) $y=\dfrac{x^4}{x^3-1}$ flesso $\left(-\sqrt[3]{2};-\dfrac{2}{3}\sqrt[3]{2}\right)$



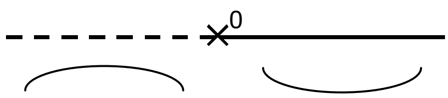
188) $y=x\cdot e^{-x}$ flesso $\left(2;\dfrac{2}{e^2}\right)$



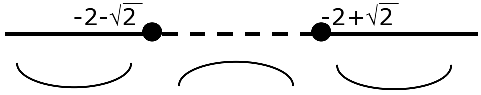
189) $y=\ln\left(\dfrac{x+1}{x^2}\right)$ flesso $\left(-2+\sqrt{3};\ln(5+11\sqrt{3})\right)$



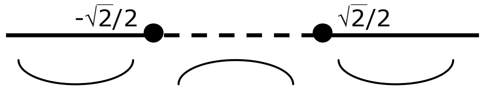
190) $y=\dfrac{e^x}{e^x-1}$ non ci sono flessi



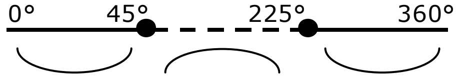
191) $y=x^2\cdot e^x$ flessi $\left(-2-\sqrt{2};(6+4\sqrt{2})\cdot e^{-2-\sqrt{2}}\right)$ $\left(-2+\sqrt{2};(6-4\sqrt{2})\cdot e^{-2+\sqrt{2}}\right)$



192) $y=e^{-x^2}$ flessi $\left(\dfrac{-\sqrt{2}}{2};\dfrac{1}{\sqrt{e}}\right)$ $\left(\dfrac{\sqrt{2}}{2};\dfrac{1}{\sqrt{e}}\right)$



y=senx-cosx flessi $\left(\dfrac{\pi}{4};0\right)$ $\left(\dfrac{5\pi}{4};0\right)$



Trova i punti di flesso delle funzioni date e le tangenti in essi.

193) $y=x^3-x^2$ [fl $\left(\frac{1}{3};-\frac{2}{27}\right)$ $y=-\frac{1}{3}x+\frac{1}{27}$]

194) y=senx [fl (0;0) y=x; fl (π;0) $y=-x+\pi$]

195) $y = x \cdot e^{-x}$ [fl $\left(2;\frac{2}{e^2}\right)$; $y=-\frac{x}{e^2}+\frac{4}{e^2}$]

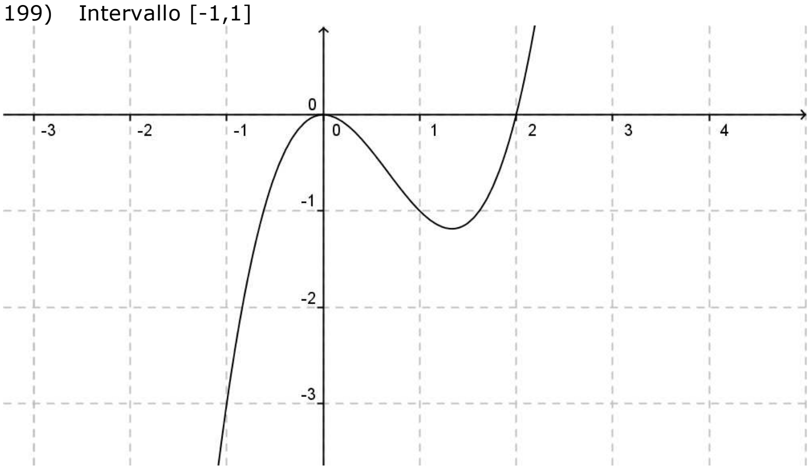
196) $y=-x^3$ [fl (0;0); y=0]

197) $y=x^4-x^3$ [fl (0;0) y=0; fl $\left(\frac{1}{2};-\frac{1}{16}\right)$ $y=-\frac{1}{4}x+\frac{1}{16}$]

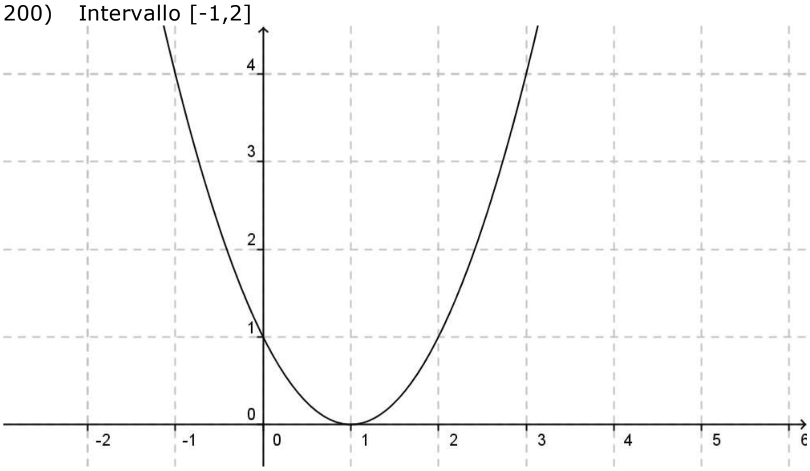
198) $y=2x^3-3x^2$ [fl $\left(\frac{1}{2};-\frac{1}{2}\right)$; $y=-\frac{3}{2}x+\frac{1}{4}$]

Dire per quali delle seguenti funzioni valgono le ipotesi del teorema di Lagrange, trova il/i punto/i c, disegna la retta passante per A e B e la retta parallela passante per c.

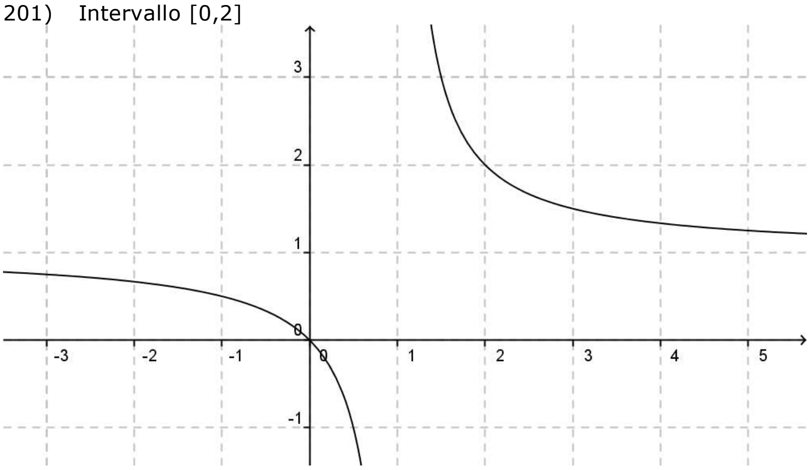
199) Intervallo [-1,1]



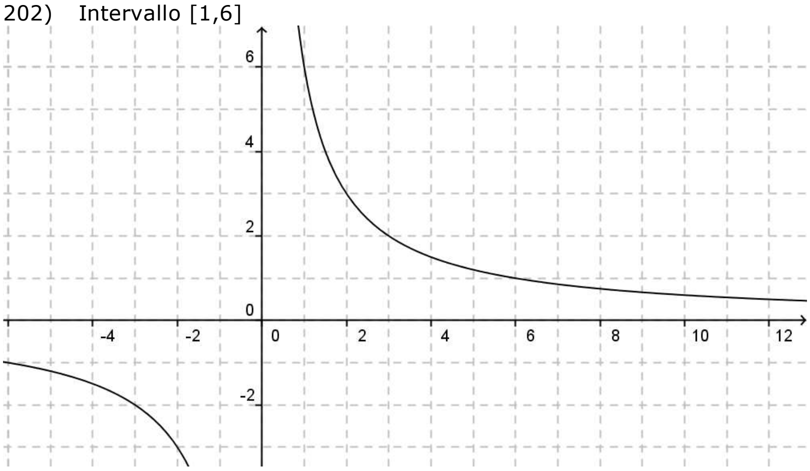
200) Intervallo [-1,2]



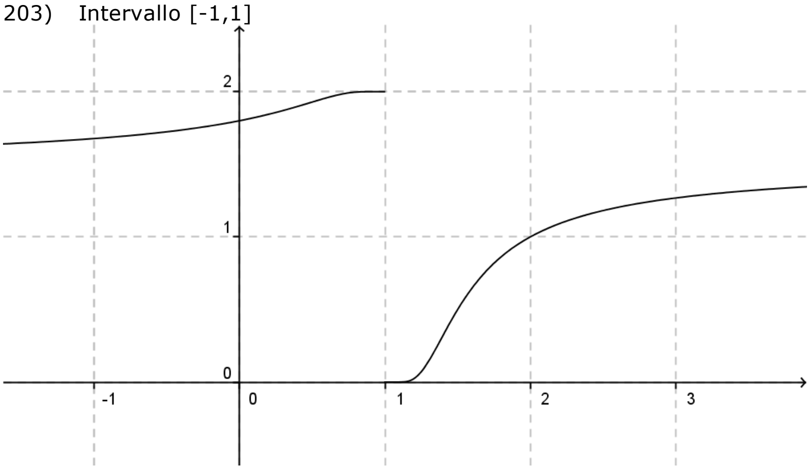
201) Intervallo [0,2]



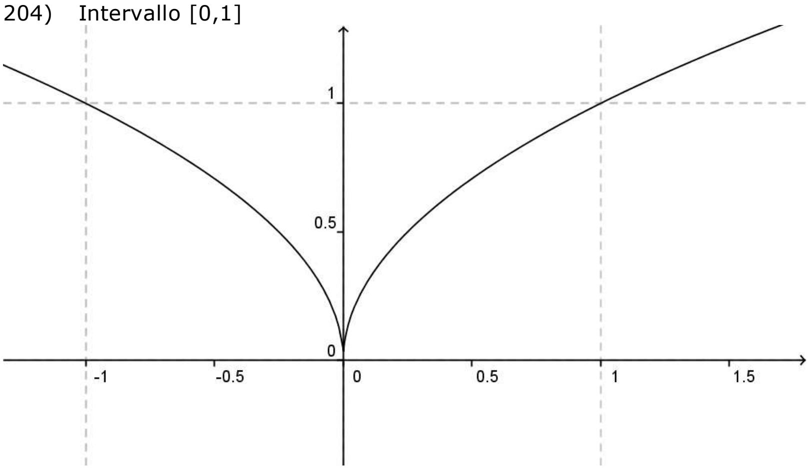
202) Intervallo [1,6]



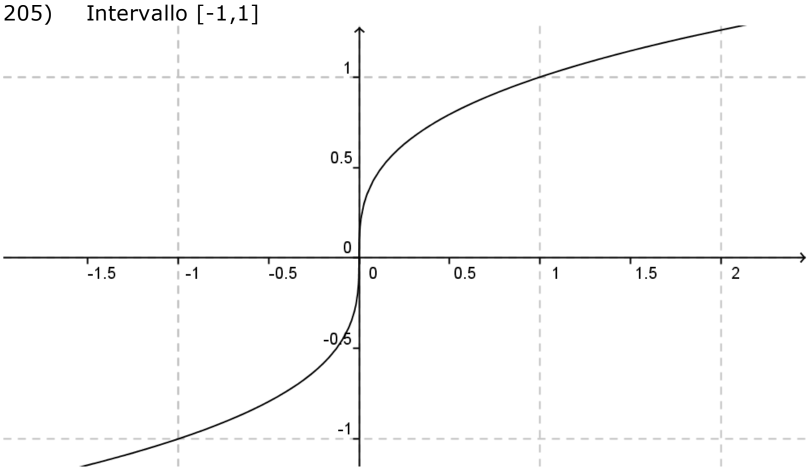
203) Intervallo [-1,1]



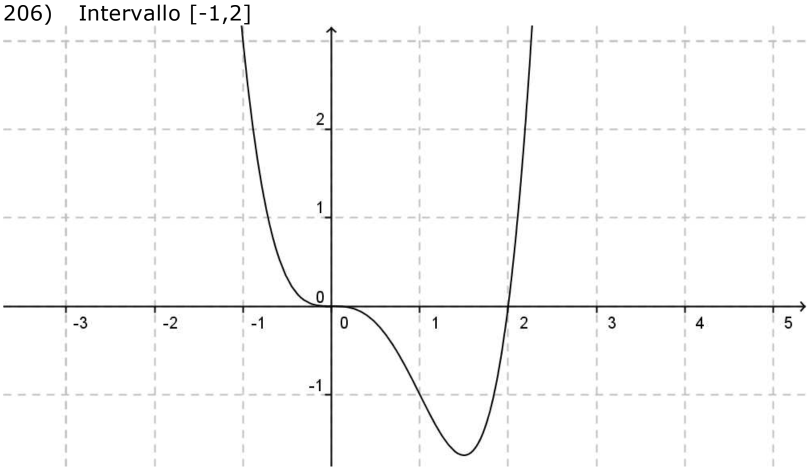
204) Intervallo [0,1]



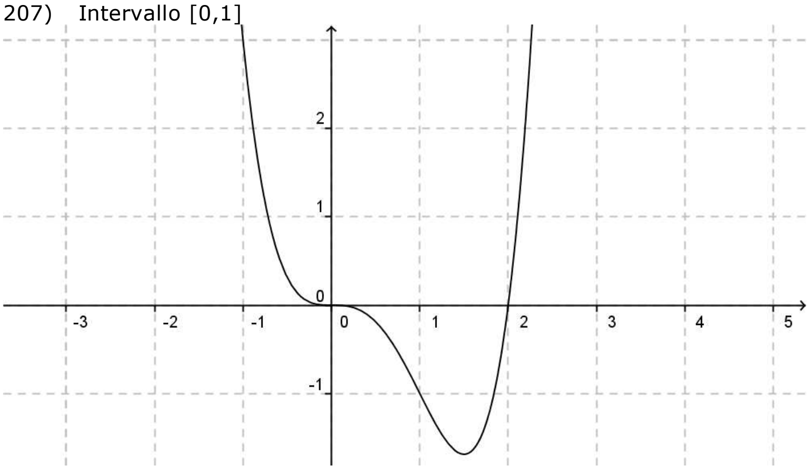
205) Intervallo [-1,1]



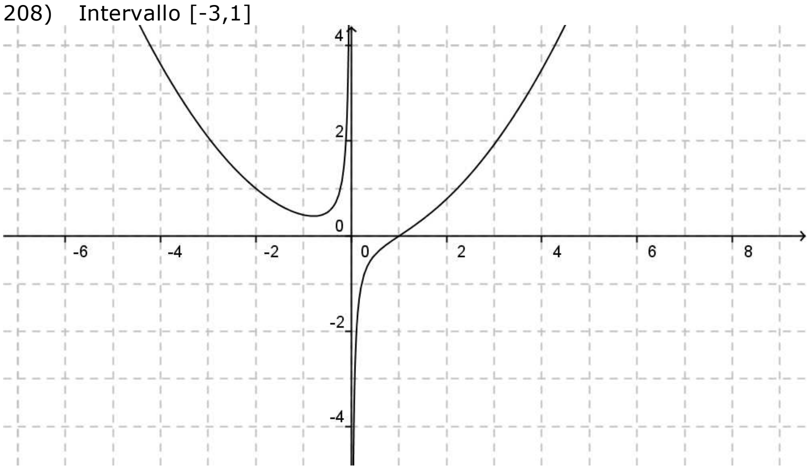
206) Intervallo [-1,2]



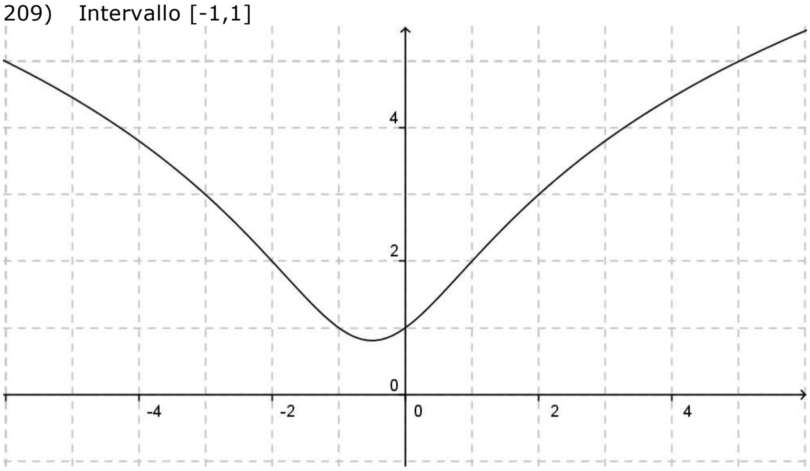
207) Intervallo [0,1]



208) Intervallo [-3,1]



209) Intervallo [-1,1]



Dire per quali delle seguenti funzioni valgono le ipotesi del teorema di Lagrange e trova il/i punto/i c.

210) $y = x^3 - 2x^2$ nell'intervallo [-1,1] $\left[c = \frac{2-\sqrt{7}}{3}\right]$

211) $y = x^2 - 2x + 1$ nell'intervallo [-1,2] $\left[c = \frac{1}{2}\right]$

212) $y = \frac{x}{x-1}$ nell'intervallo [0,2] [non vale l'ipotesi di continuità all'interno dell'intervallo]

213) $y = \frac{6}{x}$ nell'intervallo [1,6] $\left[c = \frac{5}{2}\right]$

214) $y = \frac{6}{3 + 3^{\frac{1}{x-1}}}$ nell'intervallo [-1,1] [non vale l'ip. di continuità agli estremi dell'intervallo]

215) $y = \sqrt{|x|}$ nell'intervallo [0,1] $\left[c = \frac{1}{4}\right]$

216) $y = \sqrt[3]{x}$ nell'intervallo [-1,1] [non vale l'ipotesi di derivabilità all'interno dell'intervallo ma esistono due c con le caratteristiche richieste, $c_{1,2} = \pm\frac{1}{3}$]

217) $y = x^4 - 2x^3$ nell'intervallo [-1,2] [ci sono tre valori di c, è difficile calcolarli algebricamente, approssimativamente valgono 1.36, -0.36, 0.5]

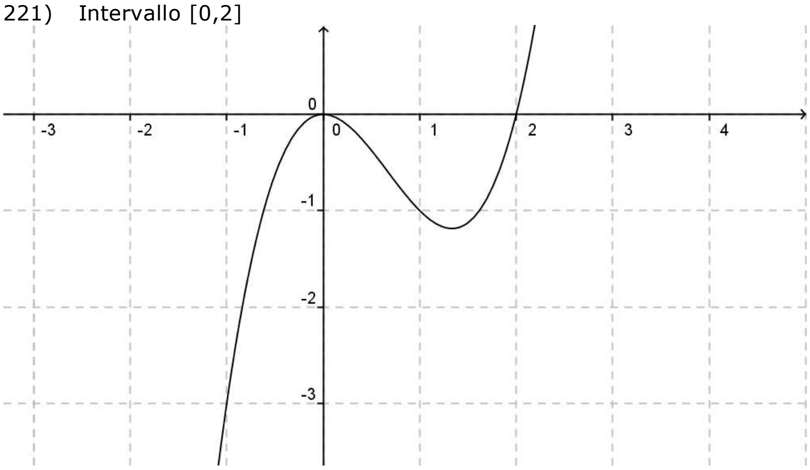
218) $y = x^4 - 2x^3$ nell'intervallo [0,1] [c'è un solo valore di c, è difficile calcolarlo algebricamente, approssimativamente vale -0.36]

219) $y = \frac{2x^3 - 2}{9x}$ nell'intervallo [-3,1] $\left[c = \sqrt[3]{-\frac{5}{9}}\right]$

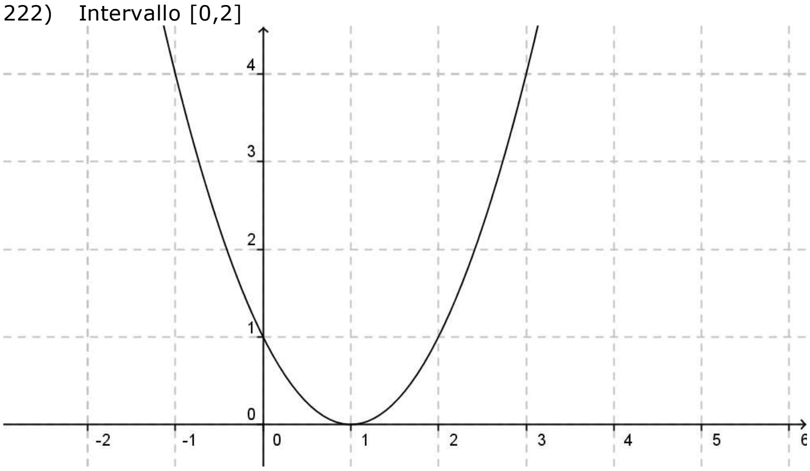
220) $y = \log_2\left(x^2 + x + 2\right)$ nell'intervallo [-1,1] $\left[c = \frac{\ln 2 - 2}{4}\right]$

Dire per quali delle seguenti funzioni valgono le ipotesi del teorema di Rolle, trova il/i punto/i c, disegna la retta tangente alla funzione passante per c.

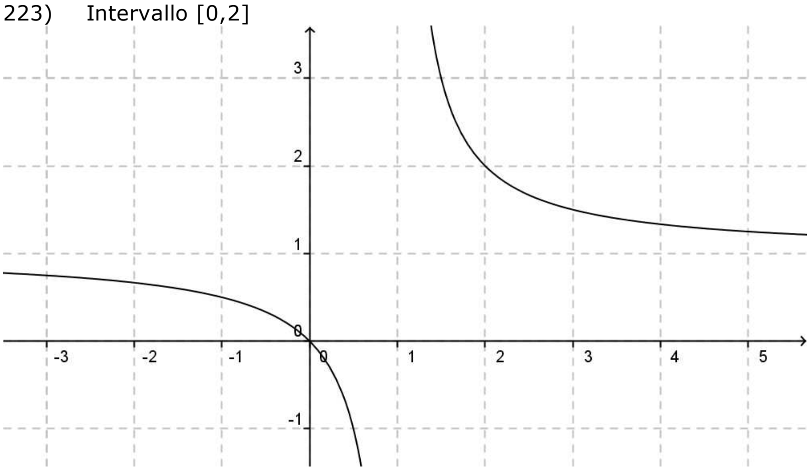
221) Intervallo [0,2]



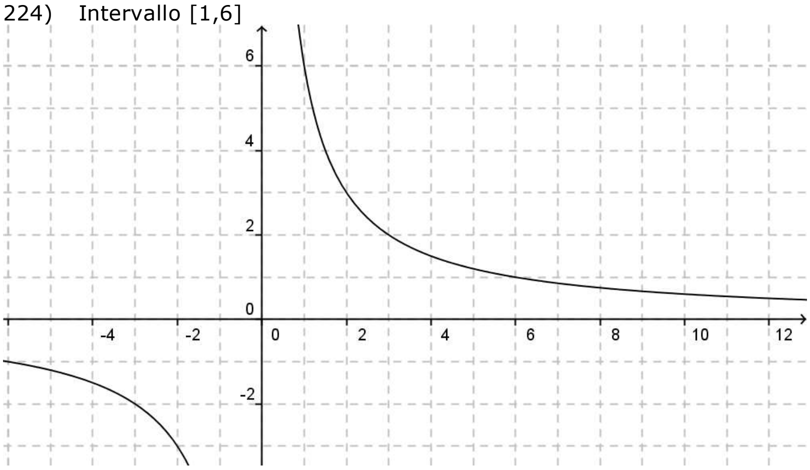
222) Intervallo [0,2]



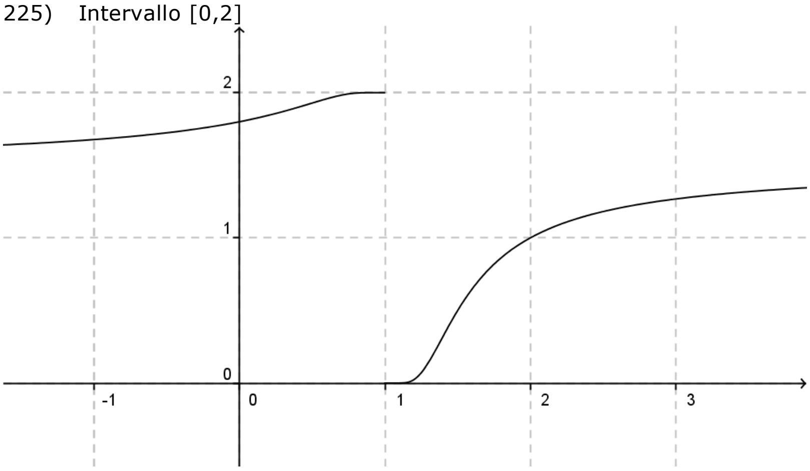
223) Intervallo [0,2]



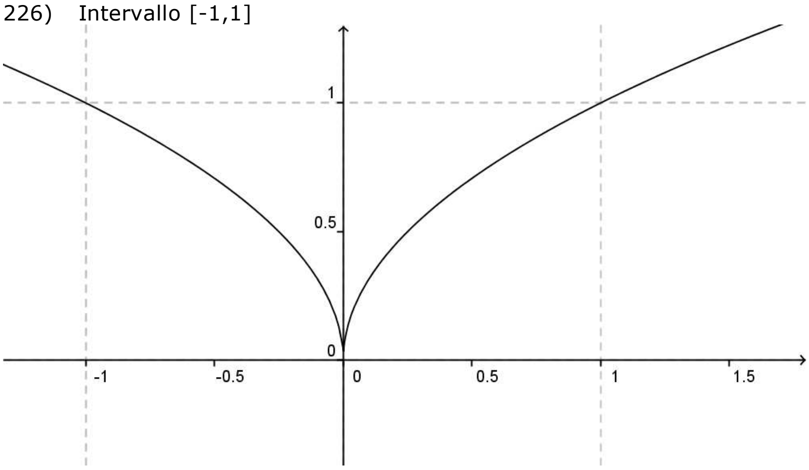
224) Intervallo [1,6]



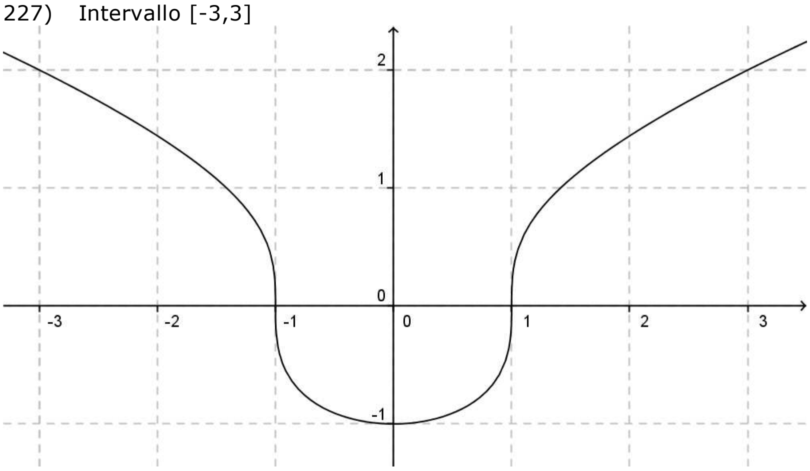
225) Intervallo [0,2]



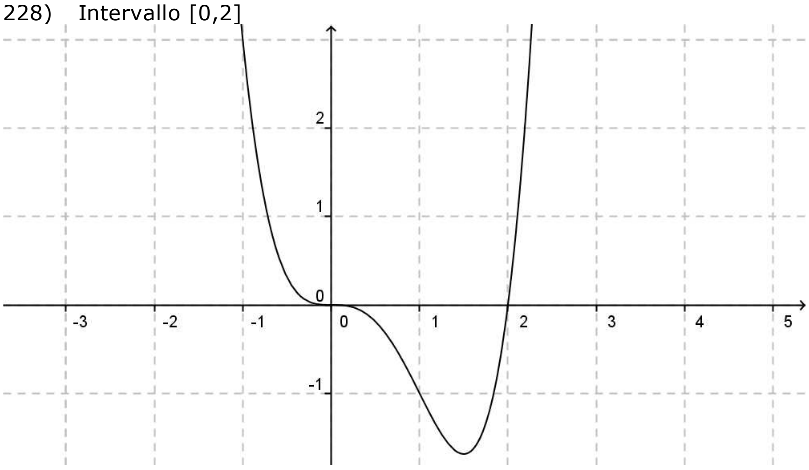
226) Intervallo [-1,1]



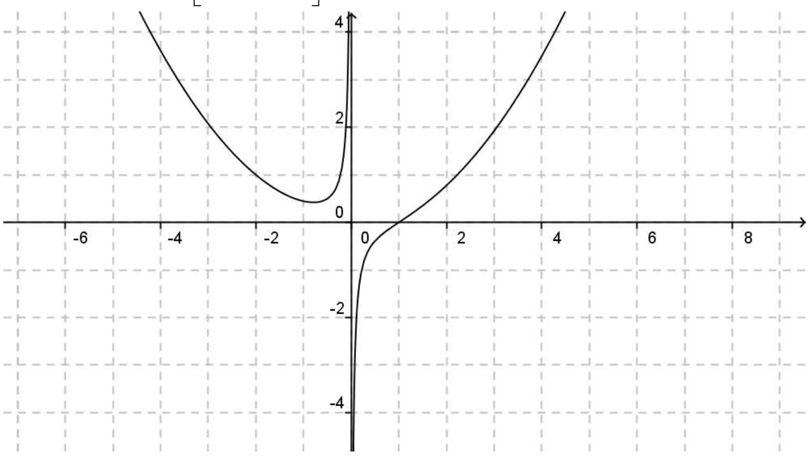
227) Intervallo [-3,3]



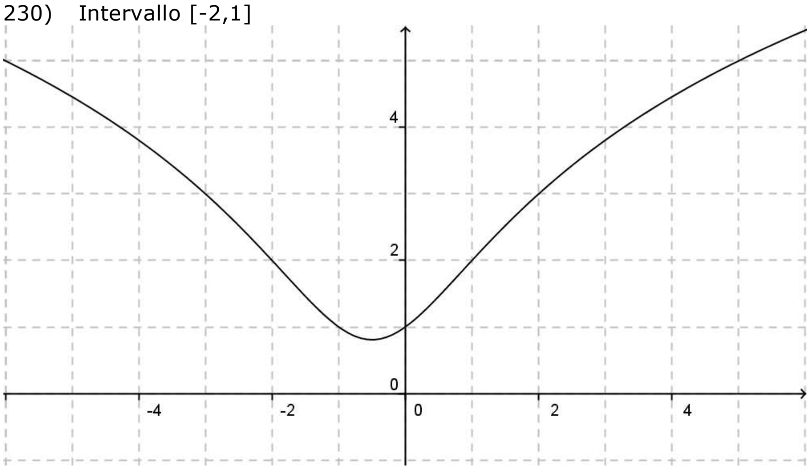
228) Intervallo [0,2]



229) Intervallo $\left[-2, \frac{2+\sqrt{6}}{2}\right]$



230) Intervallo [-2,1]



Dire per quali delle seguenti funzioni valgono le ipotesi del teorema di Rolle e trova il/i punto/i c.

231) $y = x^3 - 2x^2$ nell'intervallo [0,2] $\left[c = \frac{4}{3}\right]$

232) $y = x^2 - 2x + 1$ nell'intervallo [0,2] $\left[c = 1\right]$

233) $y = \frac{x}{x-1}$ nell'intervallo [0,2] [non vale l'ipotesi di continuità all'interno dell'intervallo]

234) $y = \frac{6}{x}$ nell'intervallo [1,6] [non vale l'ipotesi f(a)=f(b)]

235) $y = \frac{6}{3 + 3^{\frac{1}{x-1}}}$ nell'intervallo [0,2] [non vale l'ipotesi di continuità all'interno dell'intervallo]

236) $y = \sqrt{|x|}$ nell'intervallo [-1,1] [non vale l'ip. di derivabilità all'interno dell'intervallo]

237) $y = \sqrt[3]{x^2 - 1}$ nell'intervallo [-3,3] [non vale l'ip. di derivabilità all'interno dell'intervallo, ciò nonostante esiste c=0 con le caratteristiche richieste]

238) $y = x^4 - 2x^3$ nell'intervallo [0,2] $\left[c = \frac{3}{2}\right]$

239) $y = \frac{2x^3 - 2}{9x}$ nell'intervallo $\left[-2, \frac{2+\sqrt{6}}{2}\right]$ [non vale l'ip. di continuità all'interno dell'intervallo, ciò nonostante esiste c=0 con le caratteristiche richieste $c = \sqrt[3]{-\frac{1}{2}}$]

240) $y = \log_2\left(x^2 + x + 2\right)$ nell'intervallo [-2,1] $\left[c = -\frac{1}{2}\right]$

241) Data y=f(x) continua in [a,b] e derivabile in]a,b[, non è detto che esista un punto $c \in$]a,b[tale che f'(c)=0.
Si mostri il grafico di una funzione continua in [a,b] e derivabile in]a,b[per cui non esista un punto c tale che f'(c)=0, e il grafico di un'altra funzione continua in [a,b] e derivabile in]a,b[per cui esista un punto c tale che f'(c)=0.

242) Data y=f(x) continua in]a,b[, derivabile in]a,b[con f(a)=f(b), non è detto che esista un punto $c \in$]a,b[tale che f'(c)=0.
Si mostri il grafico di una funzione continua in]a,b[e derivabile in]a,b[con f(a)=f(b), per cui non esista un punto c tale che f'(c)=0, e il grafico di un'altra funzione continua in]a,b[e derivabile in]a,b[con f(a)=f(b), per cui esista un punto c tale che f'(c)=0.

243) Data y=f(x) continua in [a,b] a parte $x_0 \in$]a,b[punto di discontinuità, derivabile in]a,b[\{x_0}, con f(a)=f(b), non è detto che esista un punto $c \in$]a,b[tale che f'(c)=0.
Si mostri il grafico di una funzione continua in [a,b] a parte $x_0 \in$]a,b[punto di discontinuità e derivabile in]a,b[\{x_0}, con f(a)=f(b), per cui non esista un punto c tale che f'(c)=0, e il grafico di un'altra funzione continua in [a,b] a parte $x_0 \in$]a,b[punto di discontinuità e derivabile in]a,b[\{x_0}, con f(a)=f(b), per cui esista un punto c tale che f'(c)=0.

244) Data y=f(x) continua in]a,b[, derivabile in]a,b[\{x_0} con f(a)=f(b) e x_0 punto di non derivabilità, non è detto che esista un punto $c \in$]a,b[tale che f'(c)=0.
Si mostri il grafico di una funzione continua in]a,b[, derivabile in]a,b[\{x_0} con f(a)=f(b) e x_0 punto di non derivabilità, per cui non esista un punto c tale che f'(c)=0, e il grafico di un'altra funzione continua in]a,b[, derivabile in]a,b[\{x_0} con f(a)=f(b) e x_0 punto di non derivabilità, per cui esista un punto c tale che f'(c)=0.