28 Dato l'insieme $A = \left\{ x | x = \dfrac{n^2+2}{n^2+3} \wedge n \in N \right\}$, verificare che è limitato e ammette estremo superiore uguale a 1. Qual è il minimo di A?

29 Sia dato l'insieme $A = \left\{ x | x = (-1)^n \dfrac{2n-1}{n} \wedge n \in N_0 \right\}$; determinare l'estremo inferiore e superiore di A. $[l = -2;\ L = +2]$

30 Verificare che l'insieme $A = \left\{ x | x = log\dfrac{1}{n} \wedge n \in N_0 \right\}$ è illimitato inferiormente e ammette massimo uguale a zero.

31 Verificare che l'insieme $A = \left\{ x | x = e^{\frac{1}{n}} \wedge \ n \in N_0 \right\}$ è limitato; dimostrare che 1 è l'estremo inferiore di A.

32 Si consideri l'insieme $I = \left\{ 1; \dfrac{1}{2}; \dfrac{1}{3}; \ ...; \ \dfrac{1}{n}; \ ... \right\}$; è limitato? Quali sono i suoi estremi? Giustificare che lo zero è punto di accumulazione per l'insieme.

33 Verificare che 1 è punto di accumulazione per l'insieme $I = \left\{ \dfrac{1}{2}; \dfrac{2}{3}; \dfrac{3}{4}; \ ...; \ \dfrac{n}{n+1}; \ ... \right\}$.

Funzioni

completare...

1 Dall'esame del grafico della funzione $y = f(x)$, rappresentato in figura 1, si deduce che

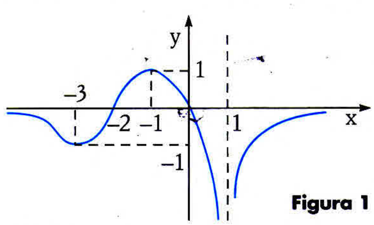

Figura 1

- il dominio è ....
- il codominio è ....
- $f(-1) =$ ....; $f(...) = -1$
- la funzione è limitata ....
- la funzione è illimitata ....
- la funzione ha un massimo assoluto uguale a ... per $x =$ ....
- la funzione è crescente negli intervalli aperti ....
- la funzione è decrescente negli intervalli aperti ....
- l'estremo inferiore (dei valori) della funzione è ....
- la disequazione $f(x) < 0$ è verificata per ....

vero o falso?

2 Il grafico di una funzione $y = f(x)$ è rappresentato in figura 2.

- Il dominio è $R - \{2\}$. V F
- Il codominio è $R - \{-2\}$. V F
- La funzione ammette minimo. V F

- La funzione è limitata. V F
- L'equazione $f(x) = -2$ è impossibile. V F
- $f(x) \geq 0$ per $0 \leq x \leq 1$. V F
- La funzione è decrescente nell'intervallo $(-\infty\ ;\ 0)$. V F
- $f(-2) < -2$. V F

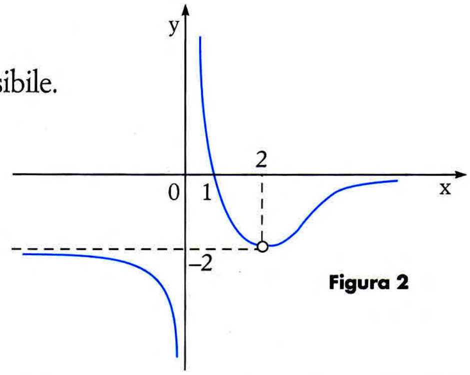

Figura 2

Dominio delle funzioni matematiche

Determinare il dominio delle seguenti **funzioni algebriche***:*

3 $y = \frac{1}{2}x^5 - x^2 + 1; \quad y = \frac{2x - \sqrt{3}}{2x^2 + x - 3}.$ $\left[R;\ R - \left\{-\frac{3}{2}\ ;\ 1\right\}\right]$

4 $y = \frac{x^5}{2x^2 + x + \sqrt{10}}; \quad y = \frac{x^2 + 1}{x^3 - x^2 + 3x - 3}.$ $[R;\ R - \{1\}]$

5 $y = \frac{x}{2x^3 - x^2 - 2x + 1}; \quad y = \frac{1 - x}{x^4 + 4x^2 + 3}.$ $\left[R - \left\{-1\ ;\ \frac{1}{2}\ ;\ 1\right\};\ R\right]$

6 $y = \frac{2}{x^4 - 18x^2 + 81}; \quad y = \sqrt{x^2 + x - 6}.$ $[R - \{-3\ ;\ +3\};\ (-\infty\ ;\ -3] \cup [2\ ;\ +\infty)]$

7 $y = \sqrt{2x - 3} + \sqrt{2 - x}; \quad y = (x^2 + x + 3)^{1/2}.$ $\left[\left[\frac{3}{2}\ ;\ 2\right];\ R\right]$

8 $y = \sqrt[4]{x^2 - 4x + 4}; \quad y = \frac{1}{\sqrt{x^2 + 10x + 25}}.$ $[R;\ R - \{-5\}]$

9 $y = \frac{1}{\sqrt{2x^2 - 5x - 3}}; \quad y = x^{-1/2} + x^{3/4} + 1.$ $\left[\left(-\infty\ ;\ -\frac{1}{2}\right) \cup (3\ ;\ +\infty);\ R^+\right]$

10 $y = [(x - 2)(x + 1)]^{-1/4}; \quad y = \sqrt[3]{\frac{1}{x - 4}}.$ $[(-\infty\ ;\ -1) \cup (2\ ;\ +\infty);\ R - \{4\}]$

11 $y = [(x - 3)^2(2x + 1)^4]^{-4/5}; \quad y = \sqrt[3]{x^3 + x^5 - \pi}.$ $\left[R - \left\{-\frac{1}{2}\ ;\ 3\right\};\ R\right]$

12 $y = \sqrt{2 - x - x^2}; \quad y = \frac{\sqrt{x + 3}}{x - 1}.$ $[[-2\ ;\ 1];\ [-3\ ;\ 1) \cup (1\ ;\ +\infty)]$

13 $y = \sqrt{\frac{x^2 - 3x}{4 - x^2}}; \quad y = (x^4 - 1)^{1/4}.$ $[(-2\ ;\ 0] \cup (2\ ;\ 3];\ (-\infty\ ;\ -1] \cup [1\ ;\ +\infty)]$

14 $y = \sqrt{\frac{x^2 + x - 2}{x^2 - 4x - 5}}.$ $[(-\infty\ ;\ -2] \cup (-1\ ;\ 1] \cup (5\ ;\ +\infty)]$

15 $y = \sqrt{\frac{x - 1}{x + 1}} + \sqrt{\frac{x}{x - 3}}.$ $[(-\infty\ ;\ -1) \cup (3\ ;\ +\infty)]$

16 $y=\sqrt{x^3-2x^2-5x+6}$; $\quad y=\sqrt{-x^6+9x^3-8}$. $\quad [[-2\,;\,1]\cup[3\,;\,+\infty);\ [1\,;\,2]]$

17 $y=\sqrt{x^4-10x^2+9}$. $\quad [(-\infty\,;\,-3]\cup[-1\,;\,1]\cup[3\,;\,+\infty)]$

18 $y=\sqrt{-x^4+17x^2-16}$; $\quad y=(x^5-16x)^{-1/2}$. $\quad [[-4\,;\,-1]\cup[1\,;\,4];\ (-2\,;\,0)\cup(2\,;\,+\infty)]$

19 $y=\dfrac{1}{\sqrt{4x^2-12x+9}}+\dfrac{2x}{\sqrt{x^2-8x+16}}+\sqrt{16-x^2}$. $\quad \left[\left[-4\,;\,\dfrac{3}{2}\right)\cup\left(\dfrac{3}{2}\,;\,4\right)\right]$

20 $y=\sqrt{1-\sqrt{x-1}}$; $\quad y=\sqrt{\sqrt{x-2}-\sqrt{2x-5}}$. $\quad \left[[1\,;\,2];\ \left[\dfrac{5}{2}\,;\,3\right]\right]$

21 $y=\sqrt{\sqrt{x^2-1}-\sqrt{x-9}}$; $\quad y=\sqrt{\sqrt{\dfrac{2}{x^2+1}}-\sqrt{x}}$. $\quad [[9\,;\,+\infty);\ [0\,;\,1]]$

22 $y=\sqrt{\sqrt{4x^2+7x-2}+3-2x}$. $\quad \left[(-\infty\,;\,-2]\cup\left[\dfrac{1}{4}\,;\,+\infty\right)\right]$

23 $y=\sqrt{2-\sqrt{\dfrac{x-9}{x-1}}}$. $\quad \left[\left(-\infty\,;\,-\dfrac{5}{3}\right]\cup[9\,;\,+\infty)\right]$

24 $y=\sqrt{\dfrac{x^2-1}{x^2-4x}}+\sqrt{\dfrac{x+1}{9-x^2}}$. $\quad [(-\infty\,;\,-3)\cup\{-1\}\cup(0\,;\,1]]$

25 $y=\sqrt{|x|-2}$; $\quad y=\sqrt{3-|x|}$. $\quad [(-\infty\,;\,-2]\cup[2\,;\,+\infty);\ [-3\,;\,3]]$

26 $y=\dfrac{1}{|x-3|-2}$; $\quad y=\dfrac{1-x^3}{|x^2-3x|+1}$. $\quad [R-\{1\,;\,5\};\ R]$

27 $y=\sqrt{-|x+2|-(x+2)^4}$; $\quad y=\dfrac{1}{|x-2|+|x-1|-3}$. $\quad [\{-2\};\ R-\{0\,;\,3\}]$

28 $y=(|2x-1|+1)^{1/2}$; $\quad y=\dfrac{x^2}{|x^2-4|-5}$. $\quad [R;\ R-\{-3\,;\,+3\}]$

29 $y=\sqrt{\dfrac{x-1}{2|x|+3}}$; $\quad y=\sqrt{\dfrac{|x|-2}{3-|x|}}$. $\quad [[1\,;\,+\infty);\ (-3\,;\,-2]\cup[2\,;\,3)]$

30 $y=\sqrt{\dfrac{|x-1|+2}{|x-2|-4}}$; $\quad y=\sqrt{|x-2|+2|x+1|-3x+2}$. $\quad [(-\infty\,;\,-2)\cup(6\,;\,+\infty);\ R]$

31 $y=\sqrt{|2x-1|+x-4}$; $\quad y=\sqrt{\dfrac{|x-2|-3}{|x|+2x-1}}$.

$\left[(-\infty\,;\,-3]\cup\left[\dfrac{5}{3}\,;\,+\infty\right);\ \left[-1\,;\,\dfrac{1}{3}\right)\cup[5\,;\,+\infty)\right]$

32 $y=\sqrt{|x^2-1|-|2x^2+x-3|-x+1}$. $\quad [[-3\,;\,-1]\cup\{1\}]$

33 $y=\sqrt{2-|x^2-2|+|2x|}$. $\quad [[-1-\sqrt{5}\,;\,1+\sqrt{5}\,]]$

Determinare il dominio delle seguenti **funzioni trascendenti (non trigonometriche)***:*

34 $y=a^{\frac{x-1}{2x-1}}$, $a\in R^+-\{1\}$; $\quad y=2^x+3^{2x-1}+5^{1/x}$. $\quad \left[R-\left\{\dfrac{1}{2}\right\};\ R-\{0\}\right]$

esercizi

capitolo 2

35 $y = log_a(2x-3), \quad a \in R^+ - \{1\}; \quad y = log\dfrac{x-2}{x}.$ $\left[\left(\dfrac{3}{2}\ ;\ +\infty\right);\ (-\infty\ ;\ 0) \cup (2\ ;\ +\infty)\right]$

36 $y = (x+1)^x; \quad y = \sqrt{2^x - 1} + \sqrt{9 - 3^x}.$ $[(-1\ ;\ +\infty);\ [0\ ;\ 2]]$

37 $y = \dfrac{1}{log_3 x - 2}; \quad y = \dfrac{e^x}{log^2 x - 4}.$ $[R^+ - \{9\};\ R^+ - \{e^{-2}\ ;\ e^2\}]$

38 $y = \sqrt{\left(\dfrac{2}{3}\right)^x - \dfrac{8}{27}}; \quad y = (32 - 4^x)^{1/2} + log\left(9^x - \dfrac{1}{3}\right).$ $\left[(-\infty\ ;\ 3];\ \left(-\dfrac{1}{2}\ ;\ \dfrac{5}{2}\right]\right]$

39 $y = \dfrac{3}{log_2^2 x - log_2 x^3 + 2}.$ $[D = R^+ - \{2\ ;\ 4\}]$

40 $y = \sqrt{log_a(3x-1)}, \quad a \in R^+ - \{1\}.$ $\left[0 < a < 1 \longrightarrow \left(\dfrac{1}{3}\ ;\ \dfrac{2}{3}\right];\ a > 1 \longrightarrow \left[\dfrac{2}{3}\ ;\ +\infty\right)\right]$

41 $y = \sqrt{log_2(1-2x) - 1}; \quad y = \sqrt{log_{1/2}(x-1) + 2}.$ $\left[\left(-\infty\ ;\ -\dfrac{1}{2}\right];\ (1\ ;\ 5]\right]$

42 $y = \sqrt{4^x - 9 \cdot 2^x + 8}; \quad y = log(4^x - 2^{x+1} - 8).$ $[(-\infty\ ;\ 0] \cup [3\ ;\ +\infty);\ (2\ ;\ +\infty)]$

43 $y = (-9^x + 10 \cdot 3^{x+1} - 81)^x; \quad y = (x-1)^{\sqrt{3-2x}}.$ $\left[(1\ ;\ 3);\ \left(1\ ;\ \dfrac{3}{2}\right]\right]$

44 $y = \sqrt{6\ log_2^2 x - log_2 x - 1}.$ $\left[\left(0\ ;\ \sqrt[3]{\dfrac{1}{2}}\right] \cup [\sqrt{2}\ ;\ +\infty)\right]$

45 $y = \sqrt{log_{\frac{1}{2}}^2 x + 3\ log_{\frac{1}{2}} x - 4}.$ $\left[\left(0\ ;\ \dfrac{1}{2}\right] \cup [16\ ;\ +\infty)\right]$

46 $y = \left[3^{2-2x} - 10 \cdot \left(\dfrac{1}{3}\right)^x + 1\right]^{1/4}.$ $[(-\infty\ ;\ 0] \cup [2\ ;\ +\infty)]$

47 $y = log\left[-27 \cdot \left(\dfrac{2}{3}\right)^{2x} + 30 \cdot \left(\dfrac{2}{3}\right)^x - 8\right].$ $[(1\ ;\ 2)]$

48 $y = \sqrt{4^{x-2} - 3^x}.$ $\left[\left[\dfrac{log\ 16}{log\ 4 - log\ 3}\ ;\ +\infty\right)\right]$

49 $y = \sqrt{2^{x+1} - 3^{x+2}}.$ $\left[\left(-\infty\ ;\ \dfrac{log\ 9 - log\ 2}{log\ 2 - log\ 3}\right]\right]$

50 $y = \sqrt{\dfrac{(3^x + 9)(2^x - 8)(4^x - \sqrt[3]{2})}{16 - 2^x}}.$ $\left[\left(-\infty\ ;\ \dfrac{1}{6}\right] \cup [3\ ;\ 4)\right]$

51 $y = \dfrac{2x}{\sqrt{4^{x+1} - 2^{x+2} + 1}}; \quad y = (x^2 - x)^{\sqrt{x}}.$ $[R - \{-1\};\ (1\ ;\ +\infty)]$

52 $y = \sqrt{a^{x^2-3} - a^{x-3}}, \quad a \in R^+ - \{1\}.$
$[a > 1 \longrightarrow (-\infty\ ;\ 0] \cup [1\ ;\ +\infty);\ 0 < a < 1 \longrightarrow [0\ ;\ 1]]$

53 $y = \sqrt{\dfrac{log_{1/2} x + 3}{log_3(x-1) - 1}}; \quad y = \sqrt[4]{log_5\ log_2(2x-3)}.$ $\left[(4\ ;\ 8];\ \left[\dfrac{5}{2}\ ;\ +\infty\right)\right]$

esercizi

capitolo 2

54 $y = \sqrt{log(x+2)} + \sqrt{log_{1/6}x - 3}$; $y = (3x - x^2)^{-\sqrt{5}}$. $\left[\left(0\,;\,\frac{1}{216}\right];\ (0\,;\,3)\right]$

55 $y = log_a\, log_a x$, $a \in R^+ - \{1\}$. $[0 < a < 1 \longrightarrow (0\,;\,1);\ a > 1 \longrightarrow (1\,;\,+\infty)]$

56 $y = \sqrt{\dfrac{x^2-9}{log_3(x-1)}}$; $y = \sqrt{|2^x - 1| - 1}$. $[(1\,;\,2) \cup [3\,;\,+\infty);\ [1\,;\,+\infty)]$

57 $y = \dfrac{\sqrt{x-2}}{log(x^2 - 4x + 3)}$; $y = (7x - 3 - 2x^2)^{\sqrt{x^2-1}}$. $[(3\,;\,2+\sqrt{2}) \cup (2+\sqrt{2}\,;\,+\infty);\ [1\,;\,3)]$

58 $y = \sqrt{2^{3x+2} - 13 \cdot 2^{2x} + 11 \cdot 2^x - 2}$. $[[-2\,;\,0] \cup [1\,;\,+\infty)]$

59 $y = log(\sqrt{log_3 x - 3} - \sqrt{log_3 x^2 - 7})$; $y = (1 - x^4)^{7+\sqrt{2}}$. $[[27\sqrt{3}\,;\,81);\ [-1\,;\,1]]$

60 $y = Log(5\ log^3_{1/2}x + 2\ log_{1/2}x - 7)$. $\left[\left(0\,;\,\frac{1}{2}\right)\right]$

61 $y = \sqrt{81\ log^4_{1/8}x + log^2_{1/2}x - 2}$. $\left[\left(0\,;\,\frac{1}{2}\right] \cup [2\,;\,+\infty)\right]$

62 $y = \sqrt{log_a(x^2-1) - log_a(x^2+3x)}$, $a \in R^+ - \{1\}$. $[0 < a < 1 \longrightarrow (1\,;\,+\infty);\ a > 1 \longrightarrow (-\infty\,;\,-3)]$

63 $y = log(\sqrt{Log\ x + 1} - \sqrt{|Log\ x| - 2})$. $[[100\,;\,+\infty)]$

64 $y = \sqrt{6\ log_{16}x + 6\ log_8 x - 7} + Log(2 - log_{1/3}x - 2\ log_3 x)$. $[[4\,;\,9)]$

Trovare il dominio delle seguenti ***funzioni trascendenti trigonometriche*** (*):

65 $y = sen\ x + 3\ cos\ 2x$; $y = \sqrt{sen\ x}$. $[R;\ \{x | 2k\pi \le x \le (2k+1)\pi\}]$

66 $y = \sqrt{cos\ x}$; $y = arc\ sen\ \dfrac{x}{4}$. $\left[\left\{x \middle| -\frac{\pi}{2} + 2k\pi \le x \le \frac{\pi}{2} + 2k\pi\right\};\ [-4\,;\,4]\right]$

67 $y = log(1 - tg\ x)$; $y = arc\ cos\dfrac{x}{6}$. $\left[\left\{x \middle| -\frac{\pi}{2} + k\pi < x < \frac{\pi}{4} + k\pi\right\};\ [-6\,;\,6]\right]$

68 $y = \sqrt{sen\ x - cos\ x}$; $y = arc\ tg\dfrac{x-1}{x-3}$. $\left[\left\{x \middle| \frac{\pi}{4} + 2k\pi \le x \le \frac{5}{4}\pi + 2k\pi\right\};\ R - \{3\}\right]$

69 $y = \dfrac{1}{2\ sen\ 4x - 1}$; $y = (log_2 cos\ x)^{-1/2}$. $\left[R - \left\{\frac{\pi}{24} + k\frac{\pi}{2};\ \frac{5}{24}\pi + k\frac{\pi}{2}\right\};\ \varnothing\right]$

70 $y = \sqrt{log_{1/2} sen\ x}$; $y = (sen\ x - 1)^{\sqrt{2}}$. $\left[\{x | 2k\pi < x < (2k+1)\pi\};\ \left\{\frac{\pi}{2} + 2k\pi\right\}\right]$

71 $y = \dfrac{1}{1 + 2\ cos\ x - sen\ x - sen\ 2x}$. $\left[R - \left\{\frac{\pi}{2} + 2k\pi\ ;\ \mp\frac{2}{3}\pi + 2k\pi\right\}\right]$

72 $y = log(4\ cos^2 x - 4\ cos\ x + 1)$. $\left[R - \left\{\mp\frac{\pi}{3} + 2k\pi\right\}\right]$

(*) Gli angoli sono espressi in radianti. In alcuni casi il dominio è richiesto nell'intervallo indicato a fianco della funzione. Nelle risposte k indica un numero intero (positivo, negativo o nullo).

73 $y = \sqrt{1 - 4\ sen^2 x}, \quad x \in [0;\ 2\pi].$ $\left[D = \left[0\ ;\ \frac{\pi}{6}\right] \cup \left[\frac{5}{6}\pi\ ;\ \frac{7}{6}\pi\right] \cup \left[\frac{11}{6}\pi\ ;\ 2\pi\right]\right]$

74 $y = \dfrac{1}{|cos\ x| + sen\ x}.$ $\left[R - \left\{\frac{5}{4}\pi + 2k\pi\ ;\ \frac{7}{4}\pi + 2k\pi\right\}\right]$

75 $y = Log\left[sen\left(x + \frac{\pi}{3}\right) + 1\right].$ $\left[R - \left\{\frac{7}{6}\pi + 2k\pi\right\}\right]$

76 $y = log(2\ sen\ 2x - \sqrt{3}), \quad x \in [0;\ 2\pi].$ $\left[\left(\frac{\pi}{6}\ ;\ \frac{\pi}{3}\right) \cup \left(\frac{7}{6}\pi\ ;\ \frac{4}{3}\pi\right)\right]$

77 $y = log(cos\ x - sen\ 2x), \quad x \in [0;\ 2\pi].$ $\left[\left[0\ ;\ \frac{\pi}{6}\right) \cup \left(\frac{\pi}{2}\ ;\ \frac{5}{6}\pi\right) \cup \left(\frac{3}{2}\pi\ ;\ 2\pi\right]\right]$

78 $y = \sqrt{(1 - 2\ sen\ x)(2\ cos\ x + \sqrt{3})}, \quad x \in \left[-\frac{\pi}{2}\ ;\ \frac{3}{2}\pi\right].$ $\left[\left[-\frac{\pi}{2}\ ;\ \frac{\pi}{6}\right] \cup \left\{\frac{5}{6}\pi\right\} \cup \left[\frac{7}{6}\pi\ ;\ \frac{3}{2}\pi\right]\right]$

79 $y = \sqrt{tg^2 x - 3}.$ $\left[\left\{x \middle| \frac{\pi}{3} + k\pi \le x \le \frac{2}{3}\pi + k\pi \wedge x \ne \frac{\pi}{2} + k\pi\right\}\right]$

80 $y = (2\ sen^2 x + sen\ x - 1)^{1/2}, \quad x \in [0;\ 2\pi].$ $\left[\left[\frac{\pi}{6}\ ;\ \frac{5}{6}\pi\right] \cup \left\{\frac{3}{2}\pi\right\}\right]$

81 $y = \sqrt{3\ sen^2 x - \sqrt{3}\ sen\ 2x - 3\ cos^2 x}, \quad x \in \left[-\frac{\pi}{2}\ ;\ \frac{3}{2}\pi\right].$

$\left[\left[-\frac{\pi}{2}\ ;\ -\frac{\pi}{6}\right] \cup \left[\frac{\pi}{3}\ ;\ \frac{5}{6}\pi\right] \cup \left[\frac{4}{3}\pi\ ;\ \frac{3}{2}\pi\right]\right]$

82 $y = \sqrt{\dfrac{\sqrt{3}\ sen\ x - cos\ x}{cos\ x}}.$ $\left[\left\{x \middle| \frac{\pi}{6} + k\pi \le x < \frac{\pi}{2} + k\pi\right\}\right]$

83 $y = \sqrt{\dfrac{2\ sen^2 x - 3\ sen\ x - 2}{2\ cos^2 x - cos\ x - 1}}, \quad x \in [0\ ;\ 2\pi].$ $\left[\left(0\ ;\ \frac{2}{3}\pi\right) \cup \left[\frac{7}{6}\pi\ ;\ \frac{4}{3}\pi\right) \cup \left[\frac{11}{6}\pi\ ;\ 2\pi\right)\right]$

84 $y = (2\ sen\ x + \sqrt{3})^{log(2\ sen\ x - 1)}, \quad x \in [0\ ;\ 2\pi].$ $\left[\left(\frac{\pi}{6}\ ;\ \frac{5}{6}\pi\right)\right]$

85 $y = [log(sen\ x + cos\ x)]^{-1/4}, \quad x \in [0\ ;\ 2\pi].$ $\left[\left(0\ ;\ \frac{\pi}{2}\right)\right]$

86 $y = log(-\sqrt{3}\ sen\ x + cos\ x + 1), \quad x \in [-\pi\ ;\ \pi].$ $\left[\left(-\pi\ ;\ \frac{\pi}{3}\right)\right]$

87 $y = (|2\ sen\ x - 1| - 1)^x, \quad x \in [0\ ;\ 2\pi].$ $[(\pi\ ;\ 2\pi)]$

88 $y = \sqrt{\dfrac{1 - \sqrt{3}\ tg\ x}{2\ sen\ x - \sqrt{3}}}, \quad x \in [0\ ;\ 2\pi].$ $\left[\left[\frac{\pi}{6}\ ;\ \frac{\pi}{3}\right) \cup \left(\frac{\pi}{2}\ ;\ \frac{2}{3}\pi\right) \cup \left[\frac{7}{6}\pi\ ;\ \frac{3}{2}\pi\right)\right]$

89 $y = log\left(1 - \sqrt{\dfrac{1 - sen\ x}{2 + sen\ x}}\right), \quad x \in \left[-\frac{\pi}{2}\ ;\ \frac{3}{2}\pi\right].$ $\left[\left(-\frac{\pi}{6}\ ;\ \frac{7}{6}\pi\right)\right]$

90 $y = (tg^2 x + 4\ sen^2 x - 3)^{log\sqrt{2\ cos\ x - 1}}, \quad x \in [0\ ;\ 2\pi].$ $\left[\left(\frac{\pi}{4}\ ;\ \frac{\pi}{3}\right) \cup \left(\frac{5}{3}\pi\ ;\ \frac{7}{4}\pi\right)\right]$

91 $y = \sqrt{|sen\ x| + \sqrt{3}\ cos\ x},\ x \in [0\ ;\ 2\pi].$ $\left[\left[0\ ;\ \frac{2}{3}\pi\right] \cup \left[\frac{4}{3}\pi\ ;\ 2\pi\right]\right]$

92 $y = \sqrt{log_a(sen\ x - cos\ x)},\quad x \in [-\pi\ ;\ \pi]$ con $a \in R^+ - \{1\}$.

$\left[0 < a < 1 \longrightarrow \left[-\pi\ ;\ -\frac{3}{4}\pi\right) \cup \left(\frac{\pi}{4}\ ;\ \frac{\pi}{2}\right];\ a > 1 \longrightarrow \left[\frac{\pi}{2}\ ;\ \pi\right]\right]$

93 $y = \sqrt{\frac{2\ sen\ 2x - 1}{\sqrt{2\ cos\ x + \sqrt{3}}}},\quad 0 \le x \le 2\pi.$ $\left[\left[\frac{\pi}{12}\ ;\ \frac{5\pi}{12}\right] \cup \left(\frac{7\pi}{6}\ ;\ \frac{17\pi}{12}\right]\right]$

Esercizi di riepilogo sulla determinazione dei domini delle funzioni matematiche

1 $y = \frac{\sqrt{x^3 - 5x^2 + 3x + 1}}{2x - 1}.$ $\left[\left[2 - \sqrt{5}\ ;\ \frac{1}{2}\right) \cup \left(\frac{1}{2}\ ;\ 1\right] \cup [2 + \sqrt{5}\ ;\ +\infty)\right]$

2 $y = \sqrt{\frac{5 - x}{7 + 6x - x^2}}.$ $[(-1\ ;\ 5] \cup (7\ ;\ +\infty)]$

3 $y = \frac{2x^2 + \sqrt{1 - x^3}}{x - \sqrt{1 - x}}.$ $\left[\left(-\infty\ ;\ \frac{\sqrt{5} - 1}{2}\right) \cup \left(\frac{\sqrt{5} - 1}{2}\ ;\ 1\right]\right]$

4 $y = \sqrt{\frac{x}{1 - 2^x}};\quad y = \frac{\left(\frac{6}{5}\right)^{x^2 - x}}{(x^2 + 4x - 5)^2}.$ $[\varnothing;\ R - \{-5\ ;\ 1\}]$

5 $y = \sqrt{\left(\frac{2}{3}\right)^{7x - x^2 - 1} - 1}.$ $\left[\left(-\infty\ ;\ \frac{7 - 3\sqrt{5}}{2}\right] \cup \left[\frac{7 + 3\sqrt{5}}{2}\ ;\ +\infty\right)\right]$

6 $y = \frac{log_a(5^{x^2 - 3x - 1} - 5^{x - 4})}{x - 5},\quad a \in R^+ - \{1\}.$ $[(-\infty\ ;\ 1) \cup (3\ ;\ 5) \cup (5\ ;\ +\infty)]$

7 $y = arc\ sen \frac{3x - 1}{x + 7};\quad y = \frac{2^{tg\ x}}{\sqrt{x^2 - 4x + 8}}.$ $\left[\left[-\frac{3}{2}\ ;\ 4\right];\ \left\{x \middle| x \neq \frac{\pi}{2} + k\pi\right\}\right]$

8 $y = \sqrt{1 - |e^{2x} - 1|}\ ;\quad y = \frac{1}{x} log \frac{e^x - 1}{x}.$ $[(-\infty\ ;\ log\sqrt{2}];\ R - \{0\}]$

9 $y = \sqrt{log_3(3x - 1) + log_3\left(2x + \frac{7}{4}\right)}.$ $\left[\left[\frac{11}{24}\ ;\ +\infty\right)\right]$

10 $y = \sqrt{\frac{log^2 x - 4}{log\ x + 1}}.$ $\left[\left[\frac{1}{e^2}\ ;\ \frac{1}{e}\right) \cup [e^2\ ;\ +\infty)\right]$

11 $y = arc\ sen[log(x - 1) - log\ x].$ $\left[\left[\frac{e}{e - 1}\ ;\ +\infty\right)\right]$

12 $y = \sqrt{2x + 1 - \sqrt[3]{8x^3 + 8x^2 + 10x + 16}}.$ $\left[\left(-\infty\ ;\ -\frac{3}{2}\right] \cup \left[\frac{5}{2}\ ;\ +\infty\right)\right]$

esercizi capitolo 2

13 $y = arc\ sen \dfrac{x^2 - 11}{x^2 - 9}$. $[(-\infty\ ;\ -\sqrt{10}] \cup [\sqrt{10}\ ;\ +\infty)]$

14 $y = arc\ sen \dfrac{3x^2 + 7x - 13}{6x - 3}$. $\left[\left[-\dfrac{16}{3}\ ;\ -2\right] \cup \left[1\ ;\ \dfrac{5}{3}\right]\right]$

15 $y = log\ arc\ sen\ log\ x$; $y = \dfrac{1}{\sqrt[4]{arc\ cos\ e^x}}$. $[(1\ ;\ e];\ R^-]$

16 $y = \sqrt{log_a(2x+1) + log_a(1-x)}$, con $a > 1$. $\left[\left[0\ ;\ \dfrac{1}{2}\right]\right]$

17 $y = \sqrt{7x - x^2 - 10} + \sqrt[5]{\dfrac{x^2 + 2x - 3}{x^2 - x - 12}}$. $[[2\ ;\ 4) \cup (4\ ;\ 5]]$

18 $y = log_2\left[\dfrac{\pi}{4} + arc\ tg\left(x^2 - \dfrac{5}{2}x\right)\right]$. $\left[\left(-\infty\ ;\ \dfrac{1}{2}\right) \cup (2\ ;\ +\infty)\right]$

19 $y = \sqrt{\dfrac{arc\ sen(x-2)}{arc\ sen(2x-3)}}$. $\left[\left[1\ ;\ \dfrac{3}{2}\right) \cup \{2\}\right]$

20 $y = \sqrt{log_4(15x^2 - 4x - 2)}$. $\left[\left(-\infty\ ;\ -\dfrac{1}{3}\right] \cup \left[\dfrac{3}{5}\ ;\ +\infty\right)\right]$

21 $y = log_5\ log_3(-14x^2 + 9x)$. $\left[\left(\dfrac{1}{7}\ ;\ \dfrac{1}{2}\right)\right]$

22 $y = log\ arc\ sen\ x - arc\ sen\ log\ x$. $\left[\left[\dfrac{1}{e}\ ;\ 1\right]\right]$

23 $y = arc\ sen \dfrac{1}{2\ sen\ x}$; $y = arc\ sen \dfrac{log\ x - 1}{log\ x + 1}$. $\left[\left\{x \middle| \dfrac{\pi}{6} + k\pi \le x \le \dfrac{5}{6}\pi + k\pi\right\};\ [1\ ;\ +\infty)\right]$

24 $y = \sqrt{\sqrt{2}\ cos\ x - 2\ cos^2 x}$, $x \in [0\ ;\ 2\pi]$. $\left[\left[\dfrac{\pi}{4}\ ;\ \dfrac{\pi}{2}\right] \cup \left[\dfrac{3}{2}\pi\ ;\ \dfrac{7}{4}\pi\right]\right]$

25 $y = \sqrt{\dfrac{2\ cos\ x + 1}{2\ cos^2 x - 1}}$, $x \in [0\ ;\ 2\pi]$. $\left[\left[0\ ;\ \dfrac{\pi}{4}\right) \cup \left[\dfrac{2}{3}\pi\ ;\ \dfrac{3}{4}\pi\right) \cup \left(\dfrac{5}{4}\pi\ ;\ \dfrac{4}{3}\pi\right] \cup \left(\dfrac{7}{4}\pi\ ;\ 2\pi\right]\right]$

26 $y = arc\ sen\sqrt{\dfrac{3 - tg^2 x}{2}}$. $\left[\left\{x \middle| -\dfrac{\pi}{3} + k\pi \le x \le -\dfrac{\pi}{4} + k\pi \ \vee\ \dfrac{\pi}{4} + k\pi \le x \le \dfrac{\pi}{3} + k\pi\right\}\right]$

27 $y = arc\ sen\left(2 - \dfrac{1}{2}\sqrt{-x^2 - 6x - 1}\right)$. $[[-5\ ;\ -$ [illegible]$]]$

28 $y = arc\ sen\left(-2 + \sqrt{-\dfrac{8}{3}x^2 + 16x - \dfrac{37}{3}}\right)$. $[[1\ ;\ 2] \cup [4\ ;\ 5]]$

29 $y = \sqrt{|log_2 x - 2| - log_2^2 x}$. $\left[\left[\dfrac{1}{4}\ ;\ 2\right]\right]$

30 $y = arc\ cos \dfrac{2\ log\ x - 3}{log\ x^3 + 1}$. $[(0\ ;\ e^{-4}] \cup [\sqrt[5]{e^2}\ ;\ +\infty)]$

31 $y = \text{arc sen}\left(-\frac{2}{3}tg^2 x + \frac{8}{3}tg\, x - \frac{5}{3}\right).$ $\left[\left\{x \middle| \frac{\pi}{12} + k\pi \le x \le \frac{5}{12}\pi + k\pi\right\}\right]$

32 $y = \text{arc sen}\frac{4\cos x - 1 - 3\sqrt{2}}{8\cos x + 1 - 3\sqrt{2}}.$

$\left[\left\{x \middle| -\frac{\pi}{4} + 2k\pi \le x \le \frac{\pi}{4} + 2k\pi \vee \frac{2}{3}\pi + 2k\pi \le x \le \frac{4}{3}\pi + 2k\pi\right\}\right]$

33 $y = \frac{\log\left(\sqrt{x^2 - 7x + 20} - \sqrt{x^2 + 4x + 3}\right)}{2x - 5 - \sqrt{6x + 13}}.$ $\left[\left[-1\, ;\, \frac{17}{11}\right)\right]$

34 $y = \log(2 - |2x - 3 - |x - 4||).$ $\left[\left(\frac{5}{3}\, ;\, 3\right)\right]$

35 $y = \frac{3x^3 + \sqrt{1 - x}}{x - \sqrt{1 - x}}.$ $\left[\left(-\infty\, ;\, \frac{\sqrt{5} - 1}{2}\right) \cup \left(\frac{\sqrt{5} - 1}{2}\, ;\, 1\right]\right]$

36 $y = \log(|x^2 - 3x + 4| + x - 2).$ $[R]$

37 $y = \sqrt{\log_{\frac{1}{2}}(|x + 2| - 2) - \log_{\frac{1}{2}}(|x + 5| + 3)}.$ $[(-\infty\, ;\, -4) \cup (0\, ;\, +\infty)]$

38 $y = \left[\log_4\left(15x^2 - 4x - 2\right)\right]^{\sqrt{3}}.$ $\left[\left(-\infty\, ;\, -\frac{1}{3}\right] \cup \left[\frac{3}{5}\, ;\, +\infty\right)\right]$

39 $y = \left[\log_3\left(-14x^2 + 9x\right)\right]^{\sqrt{2}}.$ $\left[\left[\frac{1}{7}\, ;\, \frac{1}{2}\right]\right]$

40 $y = \text{arc sen}\left(-3 + \sqrt{24x^2 - 2}\right).$ $\left[\left[-\frac{\sqrt{3}}{2}\, ;\, -\frac{1}{2}\right] \cup \left[\frac{1}{2}\, ;\, \frac{\sqrt{3}}{2}\right]\right]$

41 $y = \text{arc sen}\left(-3 + \sqrt{24\,\text{sen}^2 x - 2}\right).$

$\left[\left\{x \middle| \frac{\pi}{6} + k\pi \le x \le \frac{\pi}{3} + k\pi \vee -\frac{\pi}{3} + k\pi \le x \le -\frac{\pi}{6} + k\pi\right\}\right]$

42 $y = \left[\log_{\frac{1}{2}}(x^2 + 1) + 1\right]^{\pi};\quad y = s\left[1 + \log_{\frac{1}{5}}(x^2 + 1)\right]^{-\sqrt{3}}.$ $[[-1\, ;\, 1];\ (-2\, ;\, 2)]$

43 $y = \log_a(\text{sen}\, x + \text{cosec}\, x - 1), \quad x \in [0\, ;\, 2\pi].$ $[(0\, ;\, \pi)]$

44 $y = \sqrt{\log_{4x-1}\frac{12x^2 + 17x + 5}{12}}.$ $\left[\left(\frac{1}{4}\, ;\, \frac{1}{3}\right] \cup \left(\frac{1}{2}\, ;\, +\infty\right)\right]$

45 $y = \sqrt{-\text{arc sen}\frac{x + 1}{2x^2}}.$ $[(-\infty\, ;\, -1]]$

46 $y = \sqrt{\log_a(x^2 + 2x + 4) - \log_a(x^2 + x + 3)} + \log_a(a^{x^2 + 3x} - a^4)$, con $a \in R^+ - \{1\}$.

[se $a > 1 \longrightarrow (1\, ;\, +\infty)$; se $0 < a < 1 \longrightarrow (-4\, ;\, -1]$]