2016/2017

Určete definiční obor fce $f(x)$ a limity v jeho krajních bodech.

1. $f(x) = \log\Big(\log\big(\log(1-x)\big)\Big)$
2. $f(x) = \sqrt{\arcsin\left(\dfrac{1-x}{3x-1}\right)}$
3. $f(x) = \ln\left(\dfrac{x^2-1}{x^2-4x+4}\right)$
4. $f(x) = \operatorname{arctg}\left(\dfrac{x^2-4}{16-x^2}\right)$
5. $f(x) = \operatorname{arctg}\sqrt{3x^2-x-4}$
6. $f(x) = \arcsin\sqrt{\dfrac{x-2}{x^2+4}}$
7. $f(x) = \arcsin\left(x+\sqrt{x^2+3x+11}\right)$
8. $f(x) = \sqrt{3-\ln(x+1)}$
9. $f(x) = \ln\left(\dfrac{x^2-3x+2}{x^2-7x+12}\right)$
10. $f(x) = \dfrac{1}{1-\sqrt{1-x^2}}$
11. $f(x) = \sqrt{\ln(x^2-3x-3)}$
12. $f(x) = \sqrt{\ln\left(\dfrac{x-4}{x^2-4}\right)}$
13. $f(x) = \dfrac{1}{\sqrt{\arccos(2x^2+5x+1)}}$
14. $f(x) = \arcsin\left(\dfrac{x-5}{x^2-1}\right)$
15. $f(x) = \ln\left(x+\sqrt{x^2+3x+2}\right)$
16. $f(x) = \ln\left(\operatorname{arccotg}\left(x^3-x^{-3}\right)\right)$
17. $f(x) = \ln\left(\arcsin\left(x^2+3x+3\right)\right)$
18. $f(x) = \operatorname{arctg}\left(\sqrt{12+x-x^2}\right)$
19. $f(x) = \sqrt{\operatorname{arctg}(x^2+x-6)}$
20. $f(x) = \ln\left(\ln\left(x^2+3x+3\right)\right)$
21. $f(x) = \arcsin\left(\dfrac{1}{1-x^2}\right)$
22. $f(x) = \sqrt{\ln(x^2+x-1)}$
23. $f(x) = \arccos\left(\dfrac{1-x}{x^2+5x+6}\right)$
24. $f(x) = \ln\left(\dfrac{x+2}{1-x^2}\right)$
25. $f(x) = \ln\left(\dfrac{x^2+2x-3}{x^2-2x-3}\right)$
26. $f(x) = \arccos(-x^2-x+1)$
27. $f(x) = \ln\left(\ln\left(\dfrac{x}{x+2}\right)\right)$
28. $f(x) = \sqrt{\ln\left(5-\sqrt{x-5}\right)}$
29. $f(x) = \ln\sqrt{1-\sqrt{x-4}}$
30. $f(x) = \dfrac{1}{1-\sqrt{x^2-4x+4}}$

2016/2017

Určete definiční obor fce $f(x)$ a limity v jeho krajních bodech.

1. $\mathcal{D}(f) = (-\infty, -9)\,, \qquad \lim\limits_{x\to-\infty} f\,(x) = \infty,\ \lim\limits_{x\to-9^-} f\,(x) = -\infty,$

2. $\mathcal{D}(f) = \left\langle \frac{1}{2}, 1 \right\rangle \quad \lim\limits_{x\to\frac{1}{2}^+} f\,(x) = \sqrt{\frac{\pi}{2}},\ \lim\limits_{x\to1^-} f\,(x) = 0,$

3. $\mathcal{D}(f) = (-\infty, -1) \cup (1, 2) \cup (2, \infty)\,,$
$\lim\limits_{x\to-\infty} f\,(x) = 0,\ \lim\limits_{x\to-1^-} f\,(x) = -\infty,\ \lim\limits_{x\to1^+} f\,(x) = -\infty,\ \lim\limits_{x\to2^-} f\,(x) = \infty,\ \lim\limits_{x\to2^+} f\,(x) = \infty,\ \lim\limits_{x\to\infty} f\,(x) = 0,$

4. $\mathcal{D}(f) = (-\infty, -4) \cup (-4, 4) \cup (4, \infty)$
$\lim\limits_{x\to-\infty} f\,(x) = -\frac{\pi}{4},\ \lim\limits_{x\to-4^-} f\,(x) = -\frac{\pi}{2},\ \lim\limits_{x\to-4^+} f\,(x) = \frac{\pi}{2},\ \lim\limits_{x\to4^-} f\,(x) = \frac{\pi}{2},\ \lim\limits_{x\to4^+} f\,(x) = -\frac{\pi}{2},\ \lim\limits_{x\to\infty} f\,(x) = -\frac{\pi}{4},$

5. $\mathcal{D}(f) = (-\infty, -1\rangle \cup \left\langle \frac{4}{3}, \infty \right\rangle, \quad \lim\limits_{x\to-\infty} f\,(x) = \frac{\pi}{2},\ \lim\limits_{x\to-1^-} f\,(x) = 0,\ \lim\limits_{x\to\frac{4}{3}^+} f\,(x) = 0,\ \lim\limits_{x\to\infty} f\,(x) = \frac{\pi}{2}$

6. $\mathcal{D}(f) = \langle 2, \infty) \quad \lim\limits_{x\to2^+} f\,(x) = 0,\ \lim\limits_{x\to\infty} f\,(x) = 0,$

7. $\mathcal{D}(f) = \langle -10, -2\rangle\,, \qquad \lim\limits_{x\to-10^+} f\,(x) = -\frac{\pi}{2},\ \lim\limits_{x\to-2^-} f\,(x) = \frac{\pi}{2},$

8. $\mathcal{D}(f) = \left(-1, -1 + \mathrm{e}^3\right\rangle, \qquad \lim\limits_{x\to-1^+} f\,(x) = \infty,\ \lim\limits_{x\to(-1+\mathrm{e}^3)^-} f(x) = 0,$

9. $\mathcal{D}(f) = (-\infty, 1) \cup (2, 3) \cup (4, \infty)$
$\lim\limits_{x\to-\infty} f\,(x) = 0,\ \lim\limits_{x\to1^-} f\,(x) = -\infty,\ \lim\limits_{x\to2^+} f\,(x) = -\infty,\ \lim\limits_{x\to3^-} f\,(x) = \infty,\ \lim\limits_{x\to4^+} f\,(x) = \infty,\ \lim\limits_{x\to\infty} f\,(x) = 0$

10. $\mathcal{D}(f) = \langle -1, 0) \cup (0, 1\rangle\,,\ \lim\limits_{x\to-1^+} f\,(x) = 1,\ \lim\limits_{x\to0^-} f\,(x) = \infty,\ \lim\limits_{x\to0^+} f\,(x) = \infty,\ \lim\limits_{x\to1^-} f\,(x) = 1,$

11. $\mathcal{D}(f) = (-\infty, -1\rangle \cup \langle 4, \infty) \quad \lim\limits_{x\to-\infty} f\,(x) = \infty,\ \lim\limits_{x\to-1^-} f\,(x) = 0,\ \lim\limits_{x\to4^+} f\,(x) = 0,\ \lim\limits_{x\to\infty} f\,(x) = \infty$

12. $\mathcal{D}(f) = (-2, 0\rangle \cup \langle 1, 2) \quad \lim\limits_{x\to-2^+} f\,(x) = \infty,\ \lim\limits_{x\to0^-} f\,(x) = 0,\ \lim\limits_{x\to1^+} f\,(x) = 0,\ \lim\limits_{x\to2^-} f\,(x) = \infty,$

13.
$\mathcal{D}(f)=\left(-\frac{5}{2},-2\right\rangle\cup\left\langle-\frac{1}{2},0\right)\quad \lim_{x\to-\frac{5}{2}^+}f(x)=\infty,\ \lim_{x\to-2^-}f(x)=\frac{1}{\sqrt{\pi}},\ \lim_{x\to-\frac{1}{2}^+}f(x)=\frac{1}{\sqrt{\pi}},\ \lim_{x\to0^-}f(x)=\infty$

14.
$\mathcal{D}(f)=(-\infty,-3\rangle\cup\langle2,\infty),\qquad \lim_{x\to-\infty}f(x)=0,\ \lim_{x\to-3}f(x)=-\frac{\pi}{2},\ \lim_{x\to2}f(x)=-\frac{\pi}{2},\ \lim_{x\to\infty}f(x)=0,$

15.
$\mathcal{D}(f)=\left(-\frac{2}{3},\infty\right),\qquad \lim_{x\to-\frac{2}{3}^+}f(x)=-\infty,\ \lim_{x\to\infty}f(x)=\infty,$

16.
$\mathcal{D}(f)=\mathbb{R}\setminus\{0\},\quad \lim_{x\to-\infty}f(x)=\ln\pi,\ \lim_{x\to0^-}f(x)=-\infty,\ \lim_{x\to0^+}f(x)=\ln\pi,\ \lim_{x\to\infty}f(x)=-\infty,$

17.
$\mathcal{D}(f)=\langle-2,-1\rangle\quad \lim_{x\to-2^+}f(x)=\ln\left(\frac{\pi}{2}\right),\ \lim_{x\to1^-}f(x)=\ln\left(\frac{\pi}{2}\right)$

18.
$\mathcal{D}(f)=\langle-3,4\rangle\quad \lim_{x\to-3^+}f(x)=0,\ \lim_{x\to4^-}f(x)=0,$

19.
$\mathcal{D}(f)=(-\infty,-3)\cup(2,\infty)\quad \lim_{x\to-\infty}f(x)=\sqrt{\frac{\pi}{2}},\ \lim_{x\to-3^-}f(x)=0,\ \lim_{x\to2^+}f(x)=0,\ \lim_{x\to\infty}f(x)=\sqrt{\frac{\pi}{2}}$

20.
$\mathcal{D}(f)=(-\infty,-2)\cup(-1,\infty),\quad \lim_{x\to-\infty}f(x)=\infty,\ \lim_{x\to-2^-}f(x)=-\infty,\ \lim_{x\to-1^+}f(x)=-\infty,\ \lim_{x\to\infty}f(x)=\infty,$

21.
$\mathcal{D}(f)=\left(-\infty,-\sqrt{2}\right\rangle\cup\left\langle\sqrt{2},\infty,\right)$

$\lim_{x\to-\infty}f(x)=0^-,\ \lim_{x\to-\sqrt{2}^-}f(x)=\arcsin\left(-\frac{\sqrt{2}}{2}\right)=-\frac{\pi}{4},\ \lim_{x\to\sqrt{2}}f(x)=\frac{\pi}{4},\ \lim_{x\to\infty^-}f(x)=0^+$

22.
$\mathcal{D}(f)=(-\infty,-2\rangle\cup\langle1,\infty)\quad \lim_{x\to-\infty}f(x)=\infty,\ \lim_{x\to-2^-}f(x)=0,\ \lim_{x\to1^+}f(x)=0,\ \lim_{x\to1^-}f(x)=0,\ \lim_{x\to\infty}f(x)=\infty$

23.
$\mathcal{D}(f)=(-\infty,-5\rangle\cup\langle-1,\infty)\quad \lim_{x\to-\infty}f(x)=\frac{\pi}{2},\ \lim_{x\to-5^-}f(x)=0,\ \lim_{x\to-1^+}f(x)=0,\ \lim_{x\to\infty}f(x)=0$

24.
$\mathcal{D}(f)=(-\infty,-2)\cup(-1,1)\quad \lim_{x\to-\infty}f(x)=-\infty,\ \lim_{x\to-2^-}f(x)=-\infty,\ \lim_{x\to-1^+}f(x)=\infty,\ \lim_{x\to1^-}f(x)=\infty,$

25.
$\mathcal{D}(f)=(-\infty,-3)\cup(-1,1)\cup(3,\infty),$

$\lim_{x\to-\infty}f(x)=0,\ \lim_{x\to-3^-}f(x)=-\infty,\ \lim_{x\to-1^+}f(x)=\infty,\ \lim_{x\to1^-}f(x)=-\infty,\ \lim_{x\to3^+}f(x)=\infty,\ \lim_{x\to\infty}f(x)=0$

26.
$\mathcal{D}(f) = \langle -2, -1\rangle \cup \langle 0, 1\rangle \quad \lim\limits_{x\to -2^+} f(x) = \pi,\ \lim\limits_{x\to -1^-} f(x) = 0,\ \lim\limits_{x\to 0^+} f(x) = 0,\ \lim\limits_{x\to 1^-} f(x) = \pi,\ \lim\limits_{x\to\infty} f(x) = \infty$

27.
$\mathcal{D}(f) = (-\infty, -2) \quad \lim\limits_{x\to -\infty} f(x) = -\infty,\ \lim\limits_{x\to -2^-} f(x) = \infty$

28.
$\mathcal{D}(f) = \langle 5, 21\rangle, \quad \lim\limits_{x\to 5^+} f(x) = \sqrt{\ln 5},\ \lim\limits_{x\to 21^-} f(x) = 0$

29.
$\mathcal{D}(f) = \langle 4, 5), \quad \lim\limits_{x\to 4} f(x) = 0,\ \lim\limits_{x\to 5^-} f(x) = -\infty$

30.
$\mathcal{D}(f) = (-\infty, 1) \cup (1, 3) \cup (3, \infty),$
$\lim\limits_{x\to -\infty} f(x) = 0,\ \lim\limits_{x\to 1^-} f(x) = -\infty,\ \lim\limits_{x\to 1^+} f(x) = \infty,\ \lim\limits_{x\to 3^-} f(x) = \infty,\ \lim\limits_{x\to 3^+} f(x) = -\infty,\ \lim\limits_{x\to \infty^-} f(x) = 0,$