Vertinimo instrukcija

VBE 1 dalis (išplėstinis)

1.	$x_2 = \sqrt{2x_1+3} = \sqrt{2\cdot 3+3} = 3 \implies x_3 = \sqrt{2x_2+3} = \sqrt{2\cdot 3+3} = 3$ Atsakymas: **3**	1 taškas
2.	Atsakymas: **D**	1 taškas
3.	Atsakymas: **C**	1 taškas
4.	$\frac{m}{9} = \frac{1}{m} \implies m^2 = 9 \implies m = \pm 3$ Atsakymas: $\mathbf{m = -3}$	1 taškas
5.	$\sqrt{1-4a} = 1-a \implies a = 0; a = -2$ Atsakymas: **a=0; a=-2**	1 taškas
6.	$\sin(\operatorname{arctg}(\frac{\sqrt{3}}{3}) + 2\arccos(-\frac{\sqrt{2}}{2})) = \sin(\frac{\pi}{6} + 2\cdot\frac{3\pi}{4}) = \sin(\frac{5\pi}{3}) = -\frac{\sqrt{3}}{2}$ Atsakymas: $-\frac{\sqrt{3}}{2}$	1 taškas
7	Atsakymas: **B**	1 taškas
8	Atsakymas: **8**	1 taškas
9.	$\lim_{x\to -4}(-4x+2) = -4\cdot(-4)+2 = 18$ $\lim_{x\to -4}(\frac{k}{x+2}) = 18 \implies k = -36$ Atsakymas: **k=-36**	1 taškas
10.	$D = (-a)^2 - 4\cdot(a+2)\cdot(-a) = 0 \implies a = 0, a = -\frac{8}{5}$ Atsakymas: $a = -\frac{8}{5}$	1 taškas
11.	$\frac{m}{8n-1} = \frac{4}{m+2} = \frac{m^2-1}{2m+4} \implies m = \pm 3, n = \frac{19}{32}, n = \frac{7}{32}$ Atsakymas: $n = 3; m = \frac{19}{32}$	2 taškai
12.	$\frac{10x+5}{x+2} = \frac{10x+20-20+5}{x+2} = \frac{10(x+2)-15}{x+2} = 10 - \frac{15}{x+2}$ Atsakymas: $k = 10, m = -15$	2 taškai
13	$f(-2) = -f(2) = -(-3) = 3, f(3) = -f(-3) = -2$ $4f(-2) + 7f(3) = 4\cdot 3 + 7\cdot(-2) = -2$ Atsakymas: -2	1 taškas
14.	$\cos(bx)$ periodas yra $\frac{2\pi}{\lvert b\rvert} \implies \lvert\cos(bx)\rvert$ periodas yra $\frac{1}{2}\cdot\frac{2\pi}{\lvert b\rvert} = \frac{\pi}{\lvert b\rvert}$ $T = \frac{\pi}{3} \implies \frac{\pi}{\lvert b\rvert} = \frac{\pi}{3} \implies b = \pm 3$ $\cos(bx) \leqslant 1 \implies \lvert\cos(bx)\rvert \leqslant 1 \implies \lvert a\rvert\lvert\cos(bx)\rvert + 3 \leqslant \lvert a\rvert + 3$ $\lvert a\rvert + 3 = 5 \implies \lvert a\rvert = 2 \implies a = \pm 2$ $a = -2$ netinka, nes tuomet didžiausia reikšmė bus 3. Atsakymas: $a = 2; b = \pm 3$	2 taškai

15.	$\ln(x(2x+1)) = \ln 1 \Longrightarrow 2x^2 + x = 1 \Longrightarrow x = -1, x = \frac{1}{2}$ $x = -1$ netinka, nes $x \in (0; +\infty)$ Atsakymas: $x = \frac{1}{2}$	1 taškas
16.	$3a - 2 \leq 0 \Longrightarrow a \in (-\infty; \frac{2}{3}]$. Atsakymas: **B**	1 taškas
17.	$f(-4) + \frac{1}{2}f(5) + f(8,2) = 4 \cdot (-4) + 2 + \frac{1}{2}(\lg(2 \cdot 5) + 4) + 5 = -6,5$ Atsakymas: -6,5	1 taškas
18.	$(x-y)(x+y) = 45; 45 = 1 \cdot 45 = 3 \cdot 15 = 5 \cdot 9$ $\begin{cases} x - y = 1 \\ x + y = 45 \end{cases} \Longrightarrow (x; y) = (23; 22)$ $\begin{cases} x - y = 3 \\ x + y = 15 \end{cases} \Longrightarrow (x; y) = (9; 6)$ $\begin{cases} x - y = 5 \\ x + y = 9 \end{cases} \Longrightarrow (x; y) = (7; 2)$ Atsakymas: **C**	1 taškas
19.	Atsakymas: $a = 3; b = 2$	2 taškai
20.	$-1 \leqslant -3x^2 + 2 \leqslant 1 \Longrightarrow x \in [-1; -\frac{\sqrt{3}}{3}] \cup [\frac{\sqrt{3}}{3}; 1]$ Atsakymas: **C**	1 taškas
21.1.	Atsakymas: $\sqrt[3]{a^2} + \sqrt[3]{b^2}$	1 taškas
21.2.	Atsakymas: -4	1 taškas
21.3.	Atsakymas: $\frac{a^3 - b^3}{a^3 + b^3}$	1 taškas
21.4.	Atsakymas: $-\sin\alpha$	1 taškas
22.	$a = 4; b = 5, c = -2 \Longrightarrow a + b + c = 4 + 5 + (-2) = 7$ Atsakymas: 7	1 taškas

23.	$y = (\frac{1}{3})^{\frac{3}{x}}$ apkeičiame x su y vietom: $(\frac{1}{3})^{\frac{3}{x}}$ $\log_{\frac{1}{3}}(x) = \log_{\frac{1}{3}}(\frac{1}{3})^{\frac{3}{y}} \Longrightarrow \log_{\frac{1}{3}}(x) = \frac{3}{y} \Longrightarrow y = \frac{3}{\log_{\frac{1}{3}}(x)}$ Atsakymas: $f^{-1}(x) = \frac{3}{\log_{\frac{1}{3}}(x)}$	1 taškas
24.1.	$b_1 = S_1 = 3 \cdot 2^{1+1} - 6 = 6$ Atsakymas: **C**	1 taškas
24.2.	$S_{10} = 3 \cdot 2^{10+1} - 6 = 6138; S_4 = 3 \cdot 2^{4+1} - 6 = 90$ $S_{5\ iki\ 10} = S_{10} - S_4 = 6048$ Atsakymas: 6048	1 taškas
25	$\overrightarrow{EB} = \frac{2}{5}\vec{a}; \overrightarrow{BD} = -\vec{a} + \vec{b} \Longrightarrow \overrightarrow{BO} = -\frac{1}{2}\vec{a} + \frac{1}{2}\vec{b}$ $\overrightarrow{EO} = \overrightarrow{EB} + \overrightarrow{BO} = -\frac{1}{10}\vec{a} + \frac{1}{2}\vec{b}$ Atsakymas: $m = -\frac{1}{10}; n = \frac{1}{2}$	2 taškai
26.	$f(5 \cdot 3) = 3f(3) + 2 \cdot 3 \Longrightarrow f(3) = \frac{7}{3}$ Atsakymas: $f(3) = \frac{7}{3}$	1 taškas
27.1.	Atsakymas: $x \in (-\frac{3}{2}; +\infty)$	1 taškas
27.2.	Atsakymas: $x \in (-\infty; -2222\frac{2}{9}]$	1 taškas
28.	$h(x) = \sqrt{\cos^2 x - 1} \Longrightarrow \cos^2(x) \geqslant 1 \Longrightarrow \frac{1+\cos(2x)}{2} \geqslant 1 \Longrightarrow \cos(2x) \geqslant 1$ $2x = t \Longrightarrow \cos(t) \geqslant 1 \Longrightarrow t = 2\pi k, k \in \mathbb{Z}$ $2x = 2\pi k, k \in \mathbb{Z} \Longrightarrow x = \pi k, k \in \mathbb{Z}$ Atsakymas: $D(h) = \{\pi k, k \in \mathbb{Z}\}$	1 taškas
29.	$AD = a - d; DE = a; EB = a + d \Longrightarrow AB = AD + DE + EB = 3a$ Pagal Talio teoremą: $\frac{AD}{AB} = \frac{AF}{AC} \Longrightarrow \frac{a-d}{3a} = \frac{AF}{AC} \Longrightarrow AF = \frac{a-d}{3a}AC$ $AE = AD + DE = 2a - d$ Pagal Talio teoremą $\frac{AE}{AB} = \frac{AG}{AC} \Longrightarrow \frac{2a-d}{3a} = \frac{AG}{AC} \Longrightarrow AG = \frac{2a-d}{3a}AC$ $FG = AG - AF = \frac{1}{3}AC; GC = AC - AG = \frac{a+d}{3a}AC$ Geometrinė progresija, tai: $FG^2 = AF \cdot GC$ $(\frac{1}{3}AC)^2 = (\frac{a-d}{3a}AC)(\frac{a+d}{3a}AC) \Longrightarrow d = 0$ Atsakymas: $q = \frac{FG}{AF} = 1$	2 taškai