1.8

$$\sum_{k=1}^{20} \frac{3k+i}{1+i} = \frac{(3+i)+(6+i)+(9+i)+\cdots+(60+i)}{1+i} = \frac{(630+20i)(1-i)}{(1+i)(1-i)} =$$

$$= \frac{630+20i-630i+20}{1+1} = \frac{650-610i}{2} = 325-305i$$

Ats.: $325-305i$

2.8

$u_1 = 2+3i$, $w = 1-i$, $z = 1+i$

$$|z| + \overline{w} + \frac{u}{|u+1|} = \sqrt{1^2+1^2} + 1 + i + \frac{2+3i}{|2+3i+1|} = \sqrt{2} + 1 + i + \frac{2+3i}{\sqrt{3^2+3^2}} =$$

$$= \frac{6+3\sqrt{2}+i3\sqrt{2}+2+3i}{3\sqrt{2}} = \frac{8+3\sqrt{2}}{3\sqrt{2}} + \frac{3i(\sqrt{2}+1)}{3\sqrt{2}} = \left(\frac{4\sqrt{2}}{3}+1\right) + i\left(1+\frac{\sqrt{2}}{2}\right)$$

Ats.: $\left(\frac{4\sqrt{2}}{3}+1\right) + i\left(1+\frac{\sqrt{2}}{2}\right)$

3.8

$$\frac{1}{3} - \frac{i}{3}$$

$$z = re^{i\Theta} \qquad r = \sqrt{\left(\frac{1}{3}\right)^2 + \left(\frac{1}{3}\right)^2} = \frac{\sqrt{2}}{3}$$

$\Theta = \frac{\pi}{4}$ (nes plokštumoje gausis statusis trikampis, kuris bus lygiašonis)

$$z = \frac{\sqrt{2}}{3} e^{i\frac{\pi}{4}}$$

Ats.: $z = \frac{\sqrt{2}}{3} e^{i\frac{\pi}{4}}$

4.8

$$x^2 - 2x + 2 = 0 \qquad D = -4$$

$$x = \frac{2 + \sqrt{-4}}{2} \quad , \quad -4 = 4e^{i\pi} \quad , \quad \sqrt{4e^{i\pi}} = \pm 2i$$

$$x = \frac{2 \pm 2i}{2} = 1 \pm i$$

Ats.: $x = \{1 + i; 1 - i\}$

5.8

$n = 12, \qquad z = -1024i$

$$|z| = \sqrt{(-1024)^2} = 1024 \qquad \sqrt[12]{1024} = \sqrt[6]{32}$$

$$\Theta = \frac{-\frac{\pi}{2} + 2\pi k}{12} \qquad \sqrt[6]{32}e^{i\frac{\frac{-\pi}{2}+2\pi k}{12}}$$

kai k=0 $\qquad \sqrt[6]{32}e^{-i\frac{\pi}{24}}$

kai k=1 $\qquad \sqrt[6]{32}e^{i\frac{\pi}{8}}$

kai k=2 $\qquad \sqrt[6]{32}e^{i\frac{7\pi}{24}}$

kai k=3 $\qquad \sqrt[6]{32}e^{i\frac{11\pi}{24}}$

kai k=4 $\qquad \sqrt[6]{32}e^{i\frac{5\pi}{8}}$

kai k=5 $\qquad \sqrt[6]{32}e^{i\frac{19\pi}{24}}$

kai k=6 $\qquad \sqrt[6]{32}e^{i\frac{23\pi}{24}}$

kai k=7 $\qquad \sqrt[6]{32}e^{i\frac{9\pi}{8}} = \sqrt[6]{32}e^{-i\frac{7\pi}{8}}$

kai k=8 $\sqrt[6]{32}e^{i\frac{31\pi}{24}} = \sqrt[6]{32}e^{-i\frac{17\pi}{24}}$

kai k=9 $\sqrt[6]{32}e^{i\frac{35\pi}{24}} = \sqrt[6]{32}e^{-i\frac{13\pi}{24}}$

kai k=10 $\sqrt[6]{32}e^{i\frac{13\pi}{8}} = \sqrt[6]{32}e^{-i\frac{3\pi}{8}}$

kai k=11 $\sqrt[6]{32}e^{i\frac{43\pi}{24}} = \sqrt[6]{32}e^{-i\frac{5\pi}{24}}$

6.8

$|z+1| \leq |z-5|, \Im(z) < 1;$

$$|x+iy+1| \leq |x+yi-5|$$

$\sqrt{(x+1)^2+y^2} \leq \sqrt{(x-5)^2+y^2}$ (galime pakelti kvadratu abi puses, nes jos bus teigiamos)

$$x^2+2x+1+y^2 \leq x^2-10x+25+y^2$$

$$x \leq 2, \quad y < 1 \text{ (iš salygos)}$$

Brėžinys: