MATEMATIK
Chalmers tekniska högskola

Hjälpmedel: inga, inte ens räknedosa
Datum: 2012-08-31

Inledande matematik M/TD, Dugga 1

NAMN: Niklas Ericsson

Personnummer: .....

Program: (ringa in) **M** **TD**

Uppgift	Poäng
1	
2	
3	
4	
SUMMA:	

1. Lös olikheten (svara med intervall), (1 p)

$$\left|\frac{1}{x} - 1\right| > 2.$$

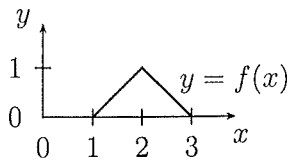
$\frac{1}{x} - 1 < -2$ eller $\frac{1}{x} - 1 > 2$

$\frac{1}{x} < -1$ -"- $\frac{1}{x} > 3$

$-1 < x < 0$ -"- $0 < x < \frac{1}{3}$

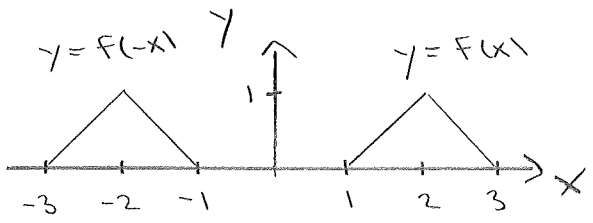
SVAR: $(-1, 0) \cup (0, \frac{1}{3})$

2. Funktionen f, med definitionsmängd $\mathcal{D}(f) = [1, 3]$, har följande graf: (1 p)

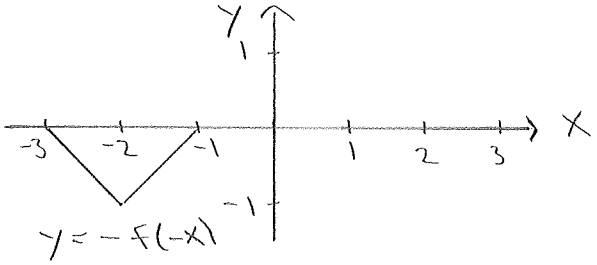


Rita grafen till funktionen $g(x) = 1 - f(-x)$. Bestäm definitionsmängden $\mathcal{D}(g)$ och värdemängden $\mathcal{V}(g)$.

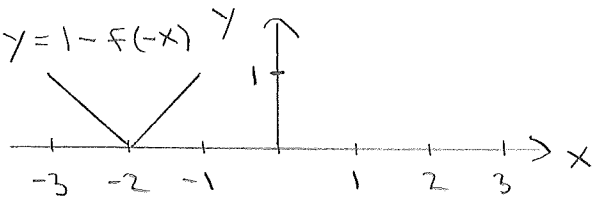
Spegling i y-axeln:



Spegling i x-axeln:



Addera 1 till y:



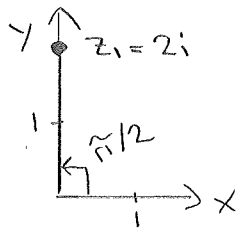
Svar: $D(g) = [-3, -1]$

$V(g) = [0, 1]$

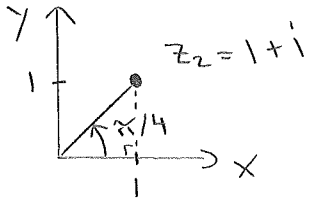
3. Bestäm principalargumentet $\operatorname{Arg} z$ till det komplexa talet (2 p)

$$z = \frac{2i(1+i)}{-1-i\sqrt{3}}.$$

$z = \dfrac{z_1 z_2}{z_3}$, där $z_1 = 2i$, $z_2 = 1+i$, $z_3 = -1-i\sqrt{3}$

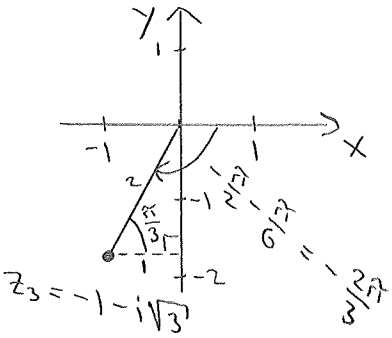


$\arg(z_1) = \dfrac{\pi}{2} = 90^\circ$



"halv kvadrat"

$\arg(z_2) = \dfrac{\pi}{4} = 45^\circ$



"halv liksidig triangel"

$\arg(z_3) = -\dfrac{2\pi}{3} = -120^\circ$

$$\arg(z) = \arg(z_1) + \arg(z_2) - \arg(z_3)$$

$$= \frac{\pi}{2} + \frac{\pi}{4} + \frac{2\pi}{3} = \frac{17\pi}{12} = 255^\circ$$

$$\operatorname{Arg}(z) = \frac{17\pi}{12} - 2\pi = -\frac{7\pi}{12} = -105^\circ$$

$\in (-\pi, \pi]$

SVAR: $-\dfrac{7\pi}{12} = -105^\circ$

4. Bevisa subtraktionsformeln för cosinus (2 p)

$$\cos(s - t) = \cos s \cos t + \sin s \sin t.$$

Se Adams / Essex eller FL-ant.