1.HA - F 7.5 und 7.7
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Aufg. 7.5

Hinweis:
passende Betrachtungsfenstereinstellung und Zoom quadratisch nutzen

Definition der Randkurven in der z-Ebene:

P_1P_2: $z(t)=2+\mathbf{j}2t,\ 0\le t\le 1,$

Define xt1(t)=re(2+**j**2t)

done

Define yt1(t)=im(2+**j**2t)

done

P_2P_3: $z(t)=2\times(1-t)+\mathbf{j}2,\ 0\le t\le 1,$

Define xt2(t)=re(2×(1-t)+**j**2)

done

Define yt2(t)=im(2×(1-t)+**j**2)

done

P_3P_4: $z(t)=0+2\times(1-t)\mathbf{j},\ 0\le t\le 1,$

Define xt3(t)=re(0+2×(1-t)**j**)

done

Define yt3(t)=im(0+2×(1-t)**j**)

done

P_4P_1: $z(t)=2t+0\mathbf{j},\ 0\le t\le 1,$

Define xt4(t)=re(2t+0j)

done

Define yt4(t)=im(2t+0j)

done

Darstellung des Quadrates Q

Definition der Bildkurven in der w-Ebene:

cExpand($(x+jy)^2$)

$x^2-y^2+2\cdot x\cdot y\cdot j$

Define xt5(t)=$xt1(t)^2-yt1(t)^2$

done

Define yt5(t)=2×xt1(t)×yt1(t)

done

Define xt6(t)=$xt2(t)^2-yt2(t)^2$

done

Define yt6(t)=2×xt2(t)×yt2(t)

done

Define xt7(t)=$xt3(t)^2-yt3(t)^2$

done

Define yt7(t)=2×xt3(t)×yt3(t)

done

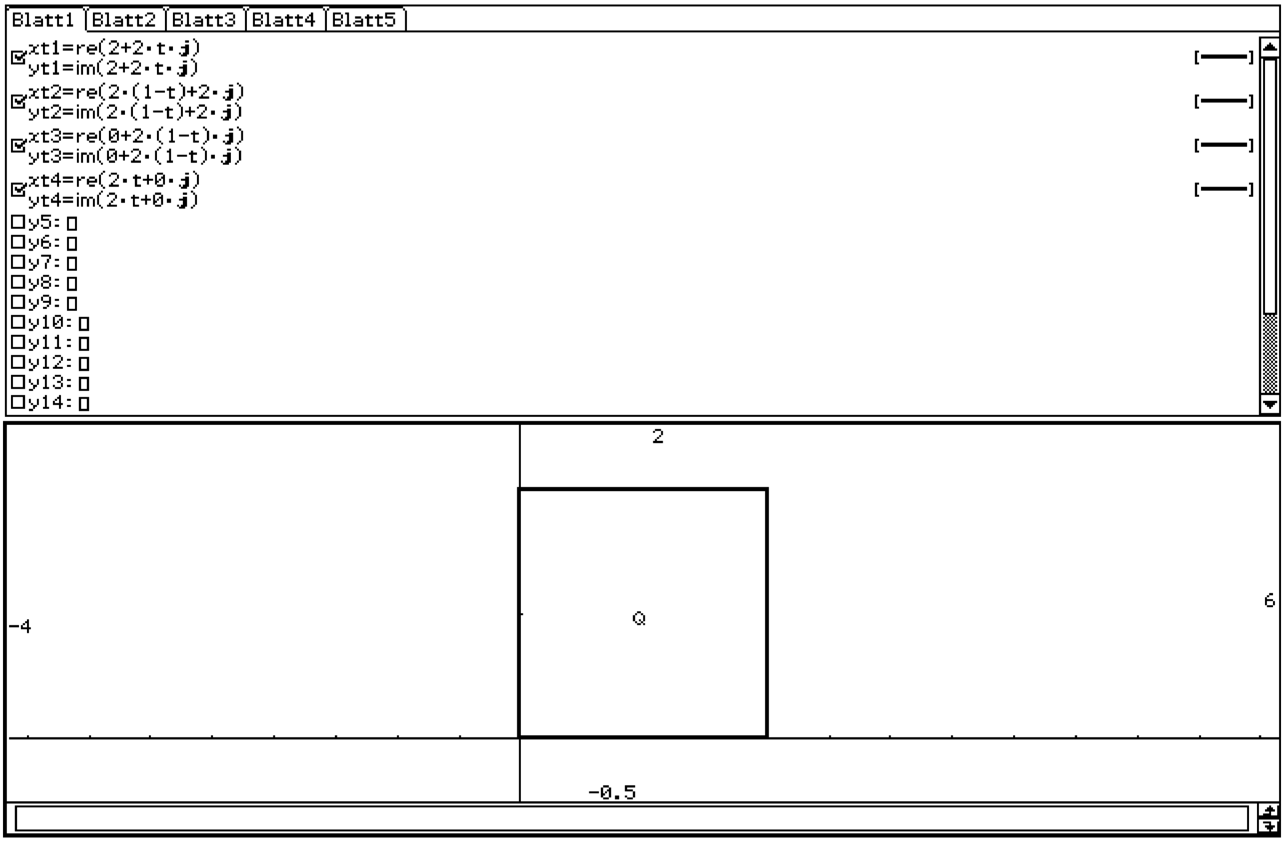
Define xt8(t)=$xt4(t)^2-yt4(t)^2$

done

Define yt8(t)=2×xt4(t)×yt4(t)

done

Darstellung des Bildes Q' des Quadrates


Blatt1
Blatt2
Blatt3
Blatt4
Blatt5
xt1=re(2+2·t·j)
yt1=im(2+2·t·j)
xt2=re(2·(1−t)+2·j)
yt2=im(2·(1−t)+2·j)
xt3=re(0+2·(1−t)·j)
yt3=im(0+2·(1−t)·j)
xt4=re(2·t+0·j)
yt4=im(2·t+0·j)
y5:
y6:
y7:
y8:
y9:
y10:
y11:
y12:
y13:
y14:
2
-4
Q
6
-0.5

Blatt1 | Blatt2 | Blatt3 | Blatt4 | Blatt5

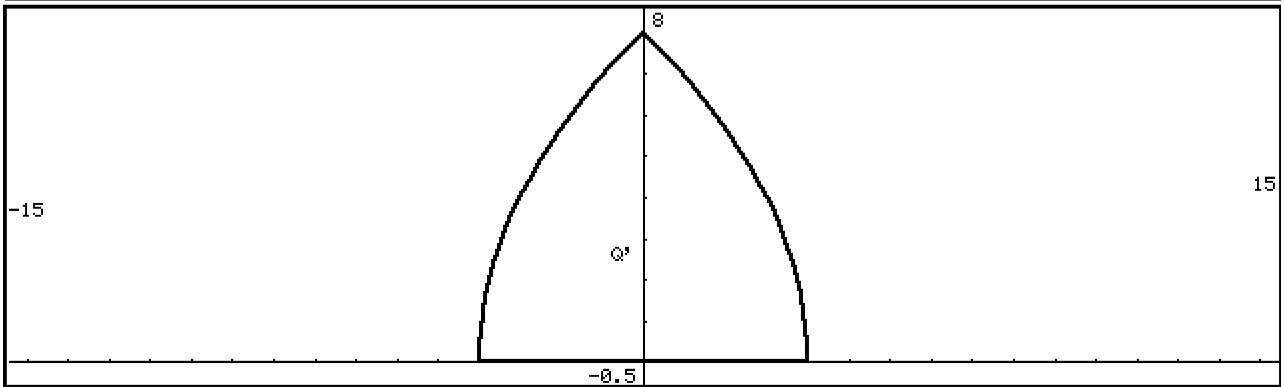
☑ $xt5=(xt1(t))^2-(yt1(t))^2$
$yt5=2\cdot xt1(t)\cdot yt1(t)$

☑ $xt6=(xt2(t))^2-(yt2(t))^2$
$yt6=2\cdot xt2(t)\cdot yt2(t)$

☑ $xt7=(xt3(t))^2-(yt3(t))^2$
$yt7=2\cdot xt3(t)\cdot yt3(t)$

☑ $xt8=(xt4(t))^2-(yt4(t))^2$
$yt8=2\cdot xt4(t)\cdot yt4(t)$

☐ y9: ▯
☐ y10: ▯
☐ y11: ▯
☐ y12: ▯
☐ y13: ▯
☐ y14: ▯
☐ y15: ▯
☐ y16: ▯
☐ y17: ▯



Aufg. 7.7

Hinweis: Grundeinstellung Variable reell nutzen

$x+jy \Rightarrow z$

$$x+y\cdot j$$

$u+jv \Rightarrow w$

$$u+v\cdot j$$

$\mathrm{re}\left(z=e^{w}+w+1\right)$

$$x=\cos(v)\cdot e^{u}+u+1$$

$\mathrm{im}\left(z=e^{w}+w+1\right)$

$$y=\sin(v)\cdot e^{u}+v$$

$\{-5,-4,-3,-2,-1,0,.5,1,1.25,1.5,1.75,2\} \Rightarrow c1$

$$\left\{-5,-4,-3,-2,-1,0,\frac{1}{2},1,\frac{5}{4},\frac{3}{2},\frac{7}{4},2\right\}$$

$\mathrm{seq}(c,c,-1,1,.25)\times\pi \Rightarrow c2$

$$\left\{-\pi,\frac{-3\cdot\pi}{4},\frac{-\pi}{2},\frac{-\pi}{4},0,\frac{\pi}{4},\frac{\pi}{2},\frac{3\cdot\pi}{4},\pi\right\}$$

Define $xt9(t)=\cos(\pi t)\cdot e^{c1}+c1+1$

done

Define $yt9(t)=\sin(\pi t)\cdot e^{c1}+\pi t$

done

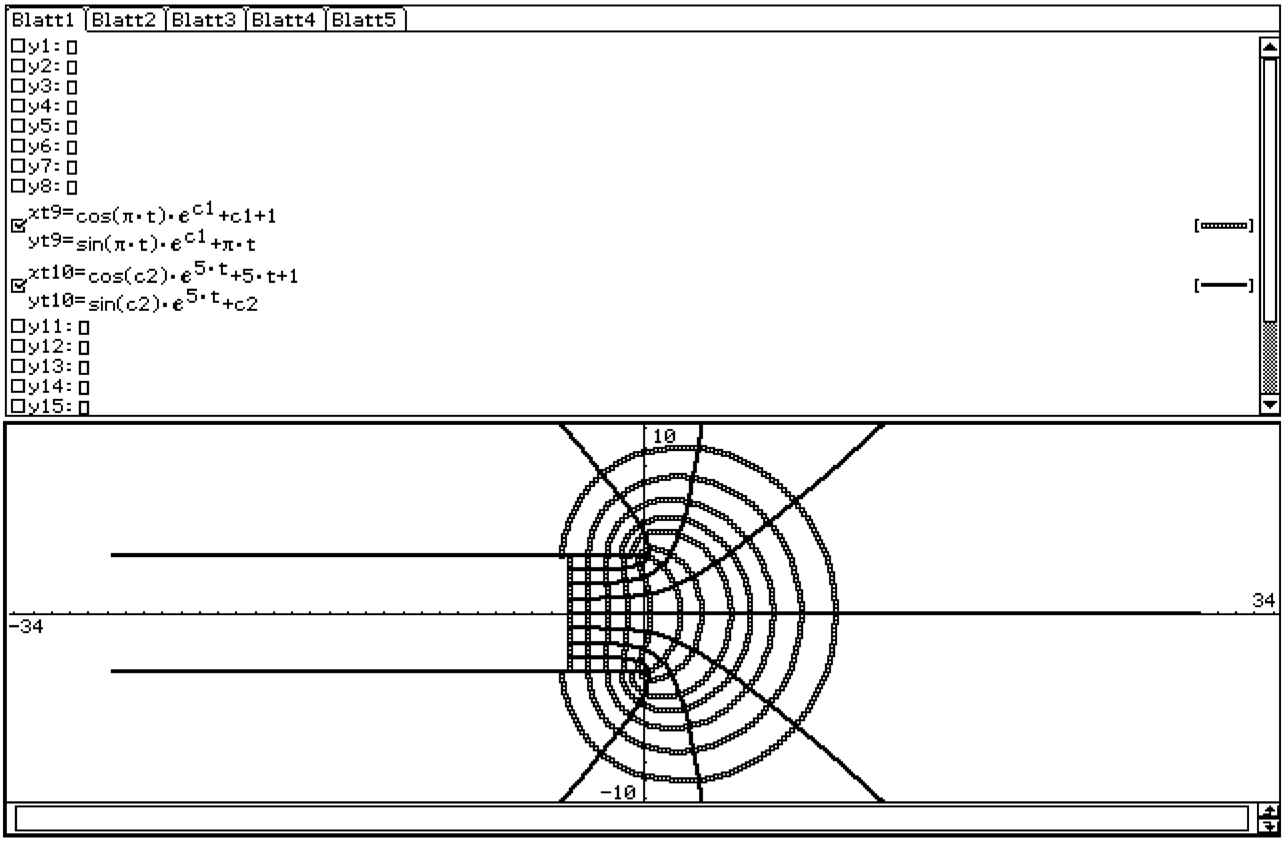
Define $xt10(t)=\cos(c2)\cdot e^{5t}+5t+1$

done

Define $yt10(t)=\sin(c2)\cdot e^{5t}+c2$

done

Feld- und Potenziallinien	Y1:… Y2:…



Blatt1 Blatt2 Blatt3 Blatt4 Blatt5
y1:
y2:
y3:
y4:
y5:
y6:
y7:
y8:
xt9=cos(π·t)·e^c1+c1+1
yt9=sin(π·t)·e^c1+π·t
xt10=cos(c2)·e^5·t+5·t+1
yt10=sin(c2)·e^5·t+c2
y11:
y12:
y13:
y14:
y15:
10
34
-34
-10