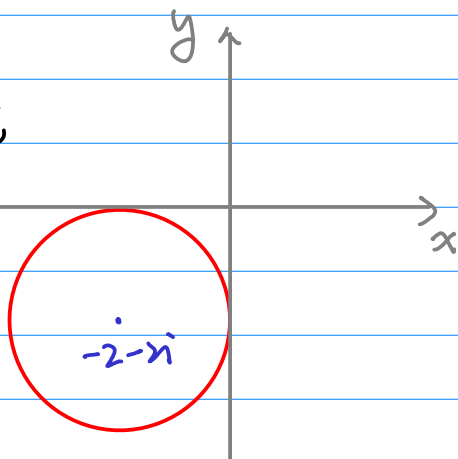


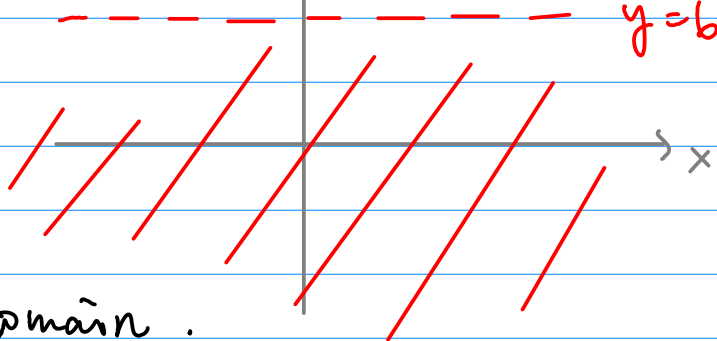
17.3

8. A circle centered at $-2-2i$, with radius 2.



12.

All below $y=6$ line

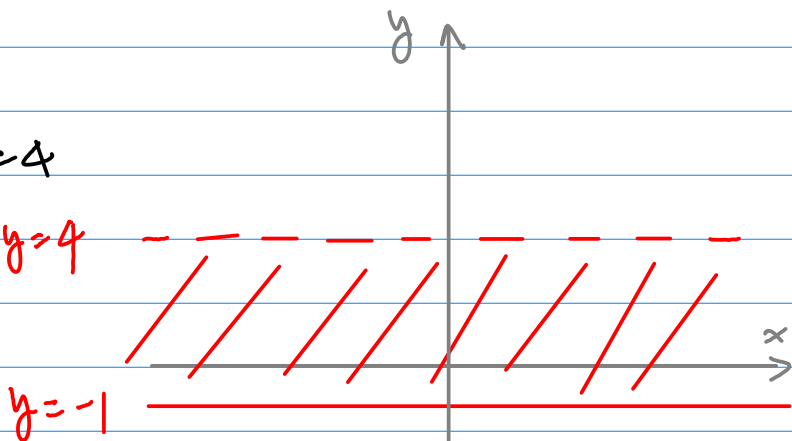


It's a domain.

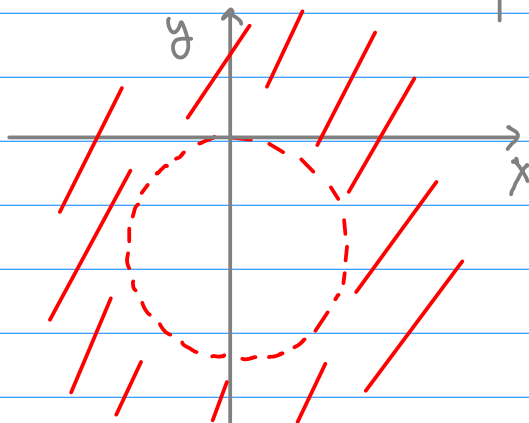
14. Between $y=-1$ & $y=4$ not including $y=4$.

$y=4$

Not a domain.

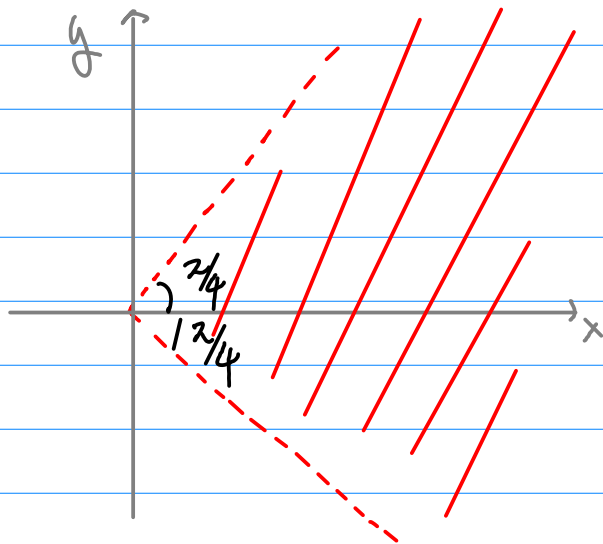


16. Outside the circle centered at $(0,-1)$ with radius 1. A domain.



18. A fan with $\frac{\pi}{2}$ angle.

It's a domain.



17.4 2. The parabola $x = 9 - \frac{y^2}{36}$.

6. The negative half of imaginary axis.

10. $u = 3x^2 - 3y^2 + 2x$, $v = 6xy + 2y$.

14. $u = 1 - \frac{x+1}{(x+1)^2 + y^2}$, $v = \frac{y}{(x+1)^2 + y^2}$

22. $\frac{1+i}{2}$

24. Fix $x=1$. $\lim_{y \rightarrow 0} \frac{x+y-1}{z-1} = -i$

Fix $y=0$. $\lim_{x \rightarrow 1} \frac{x+y-1}{z-1} = 1$

They don't match.

$$26. f'(z) = \lim_{\Delta z \rightarrow 0} \frac{f(z+\Delta z) - f(z)}{\Delta z}$$

$$= \lim_{\Delta z \rightarrow 0} \frac{1}{\Delta z} \left(\frac{1}{z+\Delta z} - \frac{1}{z} \right)$$

$$= \lim_{\Delta z \rightarrow 0} \frac{1}{\Delta z} \frac{-\Delta z}{z(z+\Delta z)}$$

$$= \lim_{\Delta z \rightarrow 0} -\frac{1}{z(z+\Delta z)}$$

$$= -\frac{1}{z^2}.$$

$$34. f'(z) = \frac{(z^3+1)(10z-1) - 3z^2(5z^2-z)}{(z^3+1)^2}$$

$$= \frac{-5z^4 + 2z^3 + 10z - 1}{(z^3+1)^2}$$

$$38. 3 \pm 4i.$$

$$17.5 \quad b. \quad u = x^2 - y^2 \quad v = -2xy$$

$$\partial_x u = \partial_y v \quad \text{only when } x=0$$

$$\partial_y u = -\partial_x v \quad \text{only when } y=0$$

$\Rightarrow f = u + iv$ differentiable only at $(0,0)$

$\Rightarrow \{(0,0)\}$ is a single pt with no interior pts
 $\Rightarrow f$ is not analytic anywhere.

8. Use the exact same method as in 6. Here Cauchy-Riemann equations are not satisfied at all.

$$16. \quad a=2, \quad b=-1, \quad c=-1, \quad d=2.$$

$$28. \quad f(z) = z e^z + i \text{ constant}$$

$$v = e^x (x \sin y + y \cos y).$$