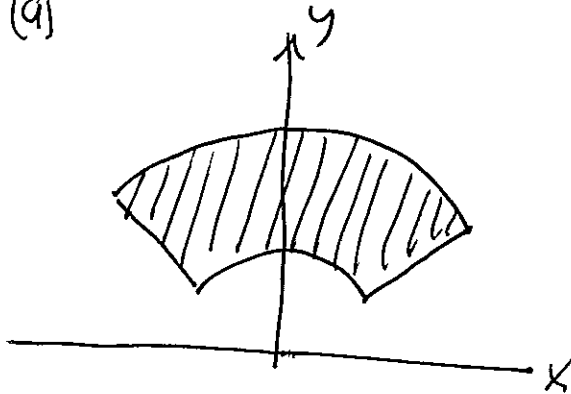


MW set 3

10

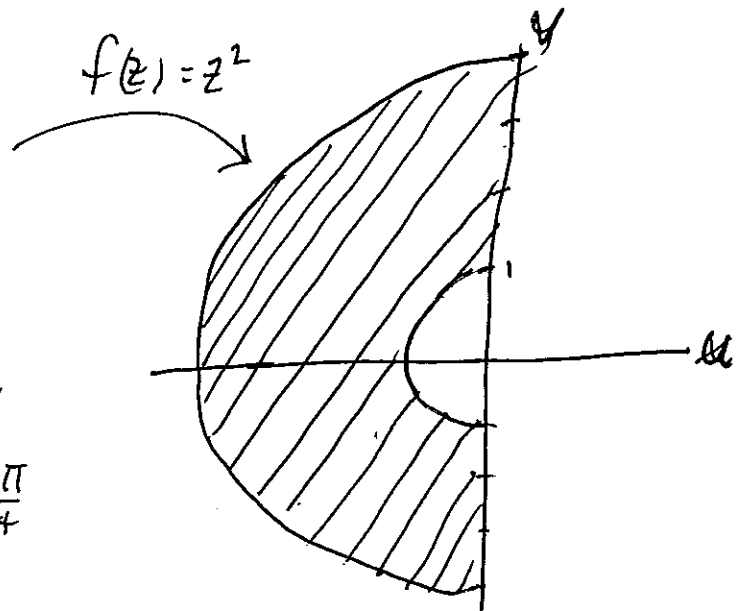
sec 2.4 : 23, 25, 31, 47*

23. (a)



$$z(t) = r e^{it}, \quad \frac{\pi}{4} \leq t \leq \frac{3\pi}{4}$$

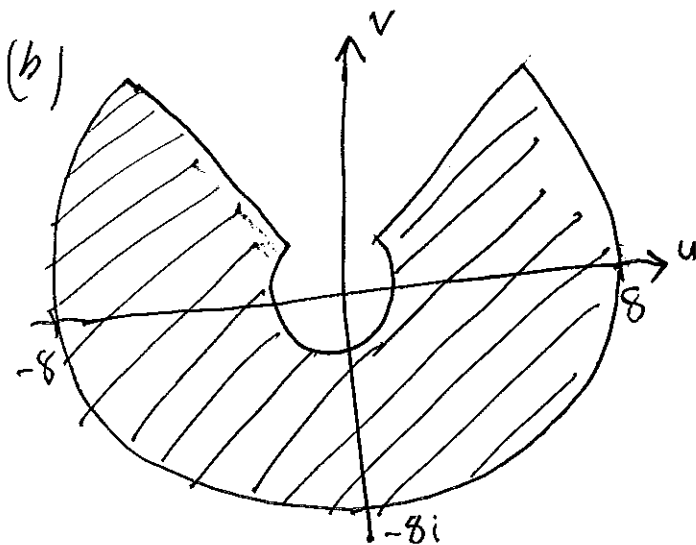
for $1 \leq r \leq 2$



$$w = f(z(t)) = r^2 e^{2it}, \quad \frac{\pi}{4} \leq t \leq \frac{3\pi}{4}$$

$1 \leq r \leq 2$

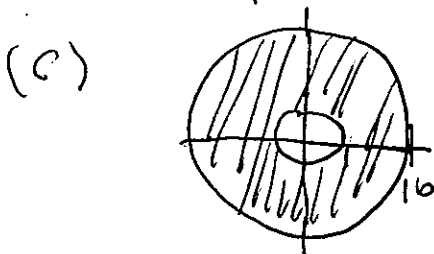
$$S' = \left\{ w \in \mathbb{C} \mid 1 \leq |w| \leq 4 \cap \begin{aligned} &-\pi < \text{Arg}(w) < -\frac{\pi}{2} \\ &\cap \frac{\pi}{2} < \text{Arg}(w) < \pi \end{aligned} \right\}$$



$$S' = \left\{ w = f(z(t)) = r^3 e^{3it}, \quad \frac{\pi}{4} \leq t \leq \frac{3\pi}{4} \right.$$

$1 \leq r \leq 2$

$$S' = \left\{ w \in \mathbb{C} \mid 1 \leq |w| \leq 8 \setminus \left\{ 1 \leq |w| \leq 8 \cap \frac{\pi}{4} \leq \text{Arg}(w) \leq \frac{3\pi}{4} \right\} \right\}$$



$$w = f(z(t)) = r^4 e^{4it}, \quad \frac{\pi}{4} \leq t \leq \frac{3\pi}{4}$$

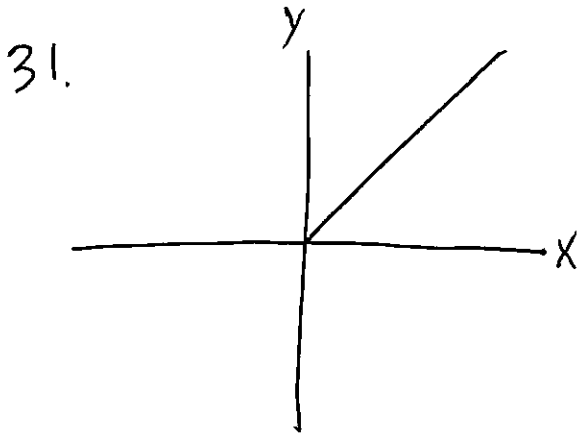
$$S' = \{ w \in \mathbb{C} \mid 1 \leq |w| \leq 16 \}$$

HW Set 3

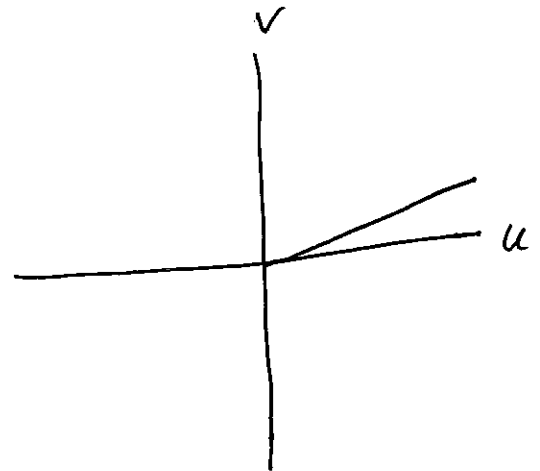
25 $f(z) = z^{1/2}$
 $z = -i$

$$f(-i) = |-i|^{1/2} e^{i \frac{\text{Arg}(-i)}{2}}$$

$$= 1^{1/2} e^{i \left(\frac{-\pi}{2} \right) \frac{1}{2}} = e^{-i \frac{\pi}{4}} = \frac{1}{\sqrt{2}} (1-i)$$



$w = z^{1/2}$



47*

$$f(z) = z^4$$

$$|w| = 4$$

$$|z^4| = 4$$

$$|z| = 4^{1/4}$$

$$z_1(t) = \sqrt{2} e^{it}, 0 \leq t \leq 2\pi$$

$$z_2(t) = \sqrt{2} e^{it}, 0 \leq t \leq \pi$$

$$z_3(t) = \sqrt{2} e^{it}, 0 \leq t \leq \frac{3\pi}{2}$$

$$z_4(t) = \sqrt{2} e^{it}, 0 \leq t \leq \frac{\pi}{2}$$

circle of radius $4^{1/4}$
 $\frac{1}{2}$ circle of radius $4^{1/4}$
 $\frac{1}{3}$ circle of radius $4^{1/4}$
 $\frac{1}{4}$ circle of radius $4^{1/4}$