

## MATH 633 HOMEWORK 6

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**Exercise.** (1)

**Exercise.** (2)  $z \mapsto az + b$  and  $z \mapsto cz + d$  are clearly entire. If  $c = 0$ , then  $\phi : z \mapsto (az + b)/(cz + d)$  is entire. If  $c \neq 0$ , then  $\phi$  is holomorphic everywhere except for  $-d/c$  and at  $-d/c$ ,  $\phi$  has a pole because  $\phi(-d/c) = \infty$ . In other words, it is meromorphic.

Let  $\phi : z \mapsto (az + b)/(cz + d)$  and  $\psi : z \mapsto (-dz + b)/(cz - a)$ . Then  $\phi(\psi(z)) = z$  and  $\psi(\phi(z)) = z$ , and  $(-d)(-a) - bc = ad - bc \neq 0$ .

Finish the last part.

**Exercise.** (3)