

## 28 Chapter: Frieze Groups and Crystallographic Groups

In order to do the exercises in this chapter you will first need to read the 5 page section on frieze groups in Chapter 28 of Gallian.

### *Exercises*

28.1 In the frieze group  $F_6$  let  $x$  denote a translation generator and  $y$  denote a horizontal reflection generator. [See Gallian Figure 28.9] Find a presentation of  $F_6$  in terms of these generators. Enter the group  $F_6$  into GAP using this presentation.

28.2 In the frieze group  $F_7$  let  $x$  denote a translation generator,  $y$  denote a horizontal reflection generator and  $z$  denote a vertical reflection generator. [See Gallian Figure 28.9] Find a presentation of  $F_7$  in terms of these generators. Enter the group  $F_7$  into GAP using this presentation.

28.3 In the frieze group  $F_7$  write  $x^2yzxz$  in the form  $x^n y^m z^k$  by hand. Use GAP to check your work. [Gallian, Chapter 28, Exercise 3]

28.4 In the frieze group  $F_7$  write  $x^{-3}zx yz$  in the form  $x^n y^m z^k$  by hand. Use GAP to check your work. [Gallian, Chapter 28, Exercise 4]

28.5 Use GAP to show that in the frieze group  $F_7$  we have that  $yz = zy$  and  $xy = yx$  but  $xz \neq zx$ . [Gallian, Chapter 28, Exercise 5]

28.6 Use GAP to show that in the frieze group  $F_7$  we have that  $zxz = x^{-1}$ . [Gallian, Chapter 28, Exercise 6]