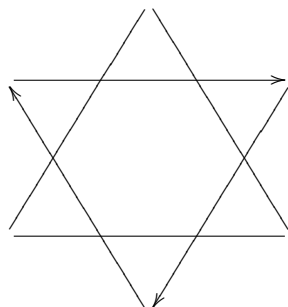
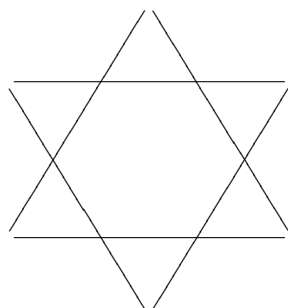
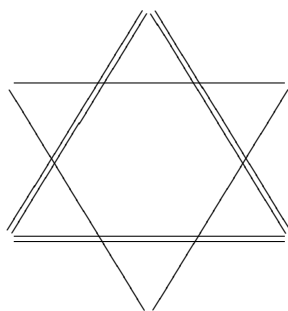


1. The following are rosette patterns. On each one, indicate the following with colored ink:
- all lines of symmetry;
  - the shortest rotation preserving the pattern. Write the angle of rotation beside the arrow.
- Below the figure, write the group that preserves the pattern.



2. The following are frieze patterns. On each one, indicate the following with colored ink:

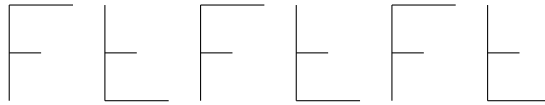
- The shortest translation,  $\tau_v$ , that preserves the pattern.
- All points of symmetry.
- All lines of symmetry.
- A fundamental region,  $R$ , for  $\mathcal{T}$ .
- A fundamental region,  $S$  for  $\mathcal{F}$ .

a)



- (i) Is there a glide reflection whose square is  $\tau_v$ ?
- (ii) Is there a glide reflection whose square is  $\tau_{2v}$ ?
- (iii) What is the isotropy subgroup of a point,  $A$ , of symmetry, provided such exists?
- (iv) Which of the seven listed groups is  $\mathcal{F}$ ?

b)



- (i) Is there a glide reflection whose square is  $\tau_v$ ?
- (ii) Is there a glide reflection whose square is  $\tau_{2v}$ ?
- (iii) What is the isotropy subgroup of a point,  $A$ , of symmetry, provided such exists?
- (iv) Which of the seven listed groups is  $\mathcal{F}$ ?

c)



- (i) Is there a glide reflection whose square is  $\tau_v$ ?
- (ii) Is there a glide reflection whose square is  $\tau_{2v}$ ?
- (iii) What is the isotropy subgroup of a point,  $A$ , of symmetry, provided such exists?
- (iv) Which of the seven listed groups is  $\mathcal{F}$ ?