Ch 1: # 5, 9 - 11, 13, 21

5) D_n, $n \geq 3$, has $2n$ elements. There are n reflections, multiples of $\frac{360}{n}$ degrees. If n is odd, there is a flip though any given vertex and the middle of its opposing edge. If n is even there is a flip through each pair of opposite verities and through the middle of each pair of opposite sides.

9) $1 \cdot 1 = 1$, just as (rotation)(rotation) is a rotation

$1 \cdot -1 = -1$, just as (rotation)(flip) is a flip

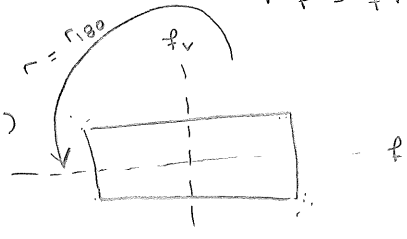
$-1 \cdot -1 = 1$, just as (flip)(flip) is a rotation

10) $\underbrace{r_1 r_2}_{\text{rotation}} f_1 r_3 \underbrace{f_2 f_3}_{\text{rotation}} r_3 = \underbrace{r_a \underbrace{f_1 \underbrace{r_3 r_b r_3}_{\text{rotation}}}_{\text{flip}}}_{\text{flip}}$

$\boxed{\text{flip}}$ (or reflection)

11) Find $A, B, C \in D_4$ s.t. $AB = BC$ but $A \neq C$.

$rf = fr^3$ but $r \neq r^3$

13) 

$\{e, r, f_v, f_h\}$

	e	r	f_v	f_h
e	e	r	f_v	f_h
r	r	e	f_h	f_v
f_v	f_v	f_h	e	r
f_h	f_h	f_v	r	e

21) The only symmetry for these is the identity.