Chris Haydak 10/30/20

Lecture 15, Exercise B

1a. $(1,1)(a,b) = (1(1\cdot a), 1b)$

$= (1a, b)$

$= (a,b)$

$(a,b)(1,1) = (a(b\cdot 1), b1)$

$= (a1, b)$

$= (a,b)$

b. $(b^{-1}\cdot a^{-1})(b^{-1}\cdot 1) = b^{-1}\cdot(aa^{-1}) = b^{-1}\cdot 1$

$= 1$

$\Rightarrow (b^{-1}\cdot a^{-1}, b^{-1})(a,b) = ((b^{-1}\cdot a^{-1})(b^{-1}\cdot 1), (b^{-1}b))$

$= (1,1)$

$(a,1)^{-1} = (1^{-1}\cdot a^{-1}, 1^{-1})$

$= (a^{-1}, 1)$

$(1,b)^{-1} = (b^{-1}\cdot 1, b^{-1})$

$= (1, b^{-1})$

Now plug in

2. $1 = x^3 \to (123)^3 = 1$

$1 = y^2 \to (12)^2 = 1$

and

$yx = (1,y)(x,1) = (1(y\cdot x), y1)$

$= (x^{-1}, y)$

$= x^{-1}y$

3. $|A \times B| = |A||B|$

$\Rightarrow |A| = 2$ or

$|B| = 4$

4. $aba^{-1} = (a,1)(1,b)(a^{-1},1)$

$= (a,b)(a^{-1},1)$

$= (a(b \cdot a^{-1}),b)$