1. The group is not closed. The group contains no identity.

2. (a) Closure. Let $A, B \in SL(2,\mathbb{R})$ and $A \circ B = C$. Then $det(C) = det(AB) = det(A)det(B) = 1$ thus $C \in SL(2,\mathbb{R})$

   (b) Associativity. Suppose $A, B, C \in SL(2,\mathbb{R})$ then $A \circ (B \circ C) = (A \circ B) \circ C$ and then $det(A)det(BC) = det(AB)det(C) = det(A)det(B)det(C) = 1$ so closure holds.

   (c) Identity. Let the identity be the 2x2 unit matrix (e). $det(e) = 1$ so $e \in SL(2,\mathbb{R})$.

   (d) Inverse. Suppose $\exists A^{-1}, A \in SL(2,\mathbb{R})$ such that $A \circ A^{-1} = A^{-1} \circ A = e$. Then we have $det(A \circ A^{-1}) = det(A^{-1}) = det(e) = 1$. So $A^{-1} \in SL(2,\mathbb{R})$.

3.

	e	a	b	c
e	e	a	b	c
a	a	b	c	e
b	b	c	e	a
c	c	e	a	b

	e	a	b	c
e	e	a	b	c
a	a	e	c	b
b	b	c	a	e
c	c	b	e	a

	e	a	b	c
e	e	a	b	c
a	a	c	e	b
b	b	e	c	a
c	c	b	a	e

	e	a	b	c
e	e	a	b	c
a	a	e	c	b
b	b	c	e	a
c	c	b	a	e

4. If $xy = zx$ implies $y = z$ then $xz = zx$ and $xy = yx$ for $\forall x, y, z \in G$ therefore the group G is abelian.

5. For n=0 the case is trivial and becomes the identity. Consider n+1 case. Then we have:

$$\begin{aligned}
(a^{-1}ba)^{n+1} &= a^{-1}b^{n+1}a \\
a^{-n-1}b^{n+1}a^{n+1} &= a^{-1}b^{n+1}a \\
a^{-1}b^{n+1}a^{1} &= a^{-1}b^{n+1}a \\
a^{-1}b^{n+1}a &= a^{-1}b^{n+1}a
\end{aligned}$$

Then consider the n-1 case. Then we have:

$$
\begin{aligned}
(a^{-1}ba)^{n-1} &= a^{-1}b^{n-1}a \\
a^{-n+1}b^{n-1}a^{n-1} &= a^{-1}b^{n-1}a \\
a^{1}b^{n-1}a^{-1} &= a^{-1}b^{n-1}a \\
a^{-1}b^{n+1}a &= a^{-1}b^{n+1}a
\end{aligned}
$$