Part 1 Theoretical Questions

a.) The addition of apply and cons in the last two lines is necessary because the parameter stream-map is a pair. The pair is a procedure and a list. Apply is a primitive function in scheme which takes a procedure and sequentially apply to every argument in the list. You can see an example of my understand in the my-apply version of my code.

b.) It works but has slightly different functionality.

Part 2 Theoretical Questions

	Output stream	a	a-list	pow	Input stream
consume	()	0	0	-	(9 8 7 4 3 6 9 1 7)
87 + 83 ≥ 100; consume	()	783	(7 8 3)	100	(8 7 4 3 6 9 1 7)
87 + 526; < 1000; produce	()	8526	(8 5 2 6)	1000	(7 4 3 6 9 1 7)
87 + 26 ≥ 100; consume	(8)	526	(5 2 6)	100	(7 4 3 6 9 1 7)
87 + 869 < 1000; produce	(8)	5869	(5 8 6 9)	1000	(4 3 6 9 1 7)
87 + 69 ≥ 100; consume	(85)	869	(8 6 9)	100	(4 3 6 9 1 7)
87 + 38 < 1000; consume	(859)	9038	(9 0 3 8)	1000	(3 6 9 1 7)
87 + 641< 1000; produce	(8590)	641	(0 6 4 1)	1000	(6 9 1 7)
932 + 87 ≥ 1000; consume	(8590)	6932	(6 9 3 2)	1000	(6 9 1 7)
103 + 87 < 10000; produce	(85907)	70103	(7 0 1 0 3)	10000	(9 1 7)
1117 + 87 < 10000; produce	(859070)	1117	(0 1 1 1 7)	10000	(1 7)

1779 + 87 < 10000; produce	(8590701)	11779	(1 1 7 7 9)	10000	(7)
779 + 87 < 1000; produce	(85907011)	1779	(1 7 7 9)	1000	()
List-to-stream	(85907011779)		(7 7 9)	-	()

2.)

- $2+\frac{1}{3}(3)=3$
- $2+\frac{1}{3}\left(2+\frac{2}{5}(3)\right)=3.06666666666$
- $2+\frac{1}{3}\left(2+\frac{2}{5}\left(2+\frac{3}{7}(3)\right)\right)=3.104761905$
- $2+\frac{1}{3}\left(2+\frac{2}{5}\left(2+\frac{3}{7}(2+\frac{4}{9}(3)\right)\right)=3.123809524$
- $2+\frac{1}{3}\left(2+\frac{2}{5}\left(2+\frac{3}{7}(2+\frac{4}{9}(2+\frac{5}{11}(3)\right)\right)\right)=3.133044733$
- $2+\frac{1}{3}\left(2+\frac{2}{5}\left(2+\frac{3}{7}(2+\frac{4}{9}(2+\frac{5}{11}(2+\frac{6}{13}(3)\right)\right)\right)\right)=3.137484737$

As you can see, even if we use three the line starts to converge towards pi.

3.) The equation corresponding to fractional linear transformation that takes x as input and add three is $f(x)=\frac{1}{x+3}$ and the corresponding matrix is $\begin{bmatrix}0 & 1\\ 1 & 3\end{bmatrix}$

4.) Ran out of time to prove this.