Exercise 1

$12.375 = (1100.011)_2$

$\quad = (1.100011 \times 2^3)_2$

	S	E	M
12.375	0	10000010	10001100000000000000000

Exercise 2

$-3.625 = (-11,101)_2$

$\quad = (-1.1101 \times 2^1)_2$

	S	E	M
-3.625	1	1000000	11010000000000000000000

Exercise 3

$0.15625 = (0.00101)_2$

$\quad = (1.01 \times 2^{-3})_2$

	S	E	M
0.15625	0	01111100	01000000000000000000000

Exercise 4

$256.75 = (100000000.11)_2$

$\quad = (1.0000000011 \times 2^8)_2$

	S	E	M
256.75	0	10000111	00000000110000000000000

Exercise 5

S	E	M
0	10000100	10110000000000000000000

We see that $(10000100)_2 = 132$

$$= 127 + 5$$

Sign is 0, so the number is positive

Solve that $(1.1011 \times 2^5)_2 = (110110)_2 = 54$

Exercise 6

-0.125 = $(-0.001)_2$

$\quad\quad = (-1 \times 2^{-3})_2$

	S	E	M
-0.125	1	01111100	0000000000000000000000000

Exercise 7

123.456 = $(1111011.0110100101111001)_2$

$\quad\quad\quad = (1.1110110110100101111001 \times 2^6)_2$

	S	E	M
123.456	0	10000101	11101101110100101111001

Exercise 8

S	E	M
1	10000010	01100000000000000000000

We see that $(10000010)_2$ = 130

$\quad\quad\quad\quad\quad\quad = 127 + 3$

Sign is 1, so the number is negative

Solve that $(-1.011 \times 2^3)_2 = (-1011)_2$ = -11

Exercise 9

9.75 = $(1001.11)_2$

$\quad\quad = (1.00111 \times 2^3)_2$

	S	E	M
9.75	0	1000010	00111000000000000000000

Exercise 10

S	E	M
0	01111110	10000000000000000000000

We see that $(01111110)_2$ = 126

$\quad\quad\quad\quad\quad\quad = 127 - 1$

Sign is 0, so the number is positive

Solve that $(1.1 \times 2^{-1})_2 = (0.11)_2 = 0.75$