Tool: I will generate random numbers using the random number generator on my calculator between 1 – 10 to represent the four different fruit symbols.

①

1, 2, 3, 4 will represent the apple symbol P(0.4)
5, 6, 7 will represent the pineapple symbol P(0.3)
8, 9 will represent the grape symbol P(0.2)
10 will represent the strawberry symbol P(0.1)

Trial: I will continue to generate random numbers until I have at least one of each of the four ② different symbols so a free movie ticket can be won. However, if I do not have at least one of each of the four different symbols when I reach 10 numbers I will stop as this represents Grace only having enough money to buy ice blocks for a maximum of ten days.
A successful trial will be if I obtain at least one of the four different symbols within 10 numbers e.g. 8, 10, 6, 6, 3. An unsuccessful trial will be after 10 numbers I still do not have at least one of each of the symbols e.g. 3, 4, 2, 4, 8, 4, 6, 9, 3, 1 so therefore a free movie ticket cannot be won.
I will repeat this 20 times to represent the 20 trials.

③

Trial	Random numbers	Phone won/success	Number of days
1	10, 9, 6, 2	✓	4
2	1, 2, 9, 9, 2, 8, 5, 8, 6, 5	✗	10
3	10, 8, 9, 1, 9, 9, 1, 2, 3, 3	✗	10
4	10, 4, 6, 6, 5, 10, 9	✓	7
5	3, 4, 5, 5, 4, 6, 8, 4, 6, 6	✗	10
6	8, 10, 7, 2	✓	4
7	9, 4, 3, 6, 10	✓	5
8	8, 5, 6, 6, 2, 5, 6, 8, 6, 5	✗	10
9	7, 3, 2, 9, 5, 1, 1, 1, 7, 6	✗	10
10	8, 5, 9, 2, 8, 5, 1, 2, 4, 4	✗	10
11	2, 1, 5, 4, 4, 2, 7, 7, 5, 3	✗	10
12	2, 7, 8, 5, 6, 2, 9, 6, 10	✓	9
13	2, 5, 3, 8, 7, 10	✓	6
14	3, 3, 5, 8, 8, 4, 6, 9, 2, 3	✗	10
15	3, 8, 6, 5, 3, 1, 5, 5, 4, 7	✗	10
16	2, 10, 5, 6, 1, 1, 8	✓	7
17	9, 8, 1, 9, 1, 9, 10, 8, 1, 10	✗	10
18	5, 3, 5, 9, 1, 7, 10	✓	7
19	7, 8, 3, 6, 10	✓	5
20	1, 10, 4, 10, 1, 6, 6, 2, 1, 6	✗	10

④

My results and calculations are only based on my simulation. Results should be treated with caution as another simulation could give a different result.

Mean number of days Grace buys ice blocks for $= \dfrac{\text{total number of days}}{\text{total number of trials}} = \dfrac{164}{20} = 8.2$ days ⑤

Probability of winning a movie ticket $= \dfrac{\text{Number of successes}}{\text{Number of trials}} = \dfrac{9}{20} = 0.45$

Based on my simulation I estimated that the mean number of days Grace will buy ice blocks for is 8.2 days and her probability of winning a free movie ticket is 0.45. However this result may vary as the numbers generated are random therefore if this trial was repeated the numbers generated could be different therefore they may well generate a different mean instead of 8.2 days.

⑥