1.1.

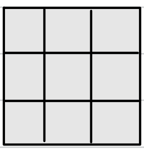
30 apples	sweet 10 apples
40 oranges	20 oranges

total 70 fruits

total sweet fruits - 30

$\frac{30}{70} = \frac{3}{7}$ is the probability of the random fruit is sweet

1.2.



3	5	3
5	8	5
3	5	3

this is propability chart of touching cells.

1 to appear in any box, the probability is 9.

$$\frac{1}{9} \cdot \frac{3}{8} + \frac{1}{9} \cdot \frac{5}{8} + \dots$$

$$\frac{1}{9} \cdot \frac{1}{8} \left(3 + 5 + 3 + \dots\right)$$

$$\frac{1}{9} \cdot \frac{1}{8} \cdot \left(3 \cdot 4 + 5 \cdot 4 + 8\right) = \frac{1}{9} \cdot \frac{1}{\cancel{8}} \cdot \overset{5}{\cancel{40}} = \frac{5}{9}$$

1.3.

a.

100 101 102

103 104 105

— — — — —

997 998 999

every third number is divided by three.

so $\frac{1}{3}$ is the probability.

b.

$$\left.\begin{array}{l} 10^2 \\ 11^2 \\ \vdots \\ 31^2 \end{array}\right)$$

22 possibility out of 900 number so $\frac{22}{900}$ is possibility

$\frac{11}{450}$

1.4.

A: 1, 2, 5, 6, 7, 9 total combinations for each three case is $6 \cdot 6 = 36$

B: 1, 3, 4, 5, 8, 9

C: 2, 3, 4, 6, 7, 8

A beats B combinations:

(1;1) (2;1) (5;1) (5;3) (5;4) (5;5) (6;1) (6;3) (6;4) (6;5)
(7;1) (7;3) (7;4) (7;5) (9;1) (9;3) (9;4) (9;5) (9;8) (9;9)

which is 20

so probability is $\frac{20}{36} = \frac{5}{9} > \frac{1}{2}$

B beats C combinations:

(3;2) (3;3) (4;2) (4;3) (4;4) (5;2) (5;3) (5;4) (8;2) (8;3)
(8;4) (8;6) (8;7) (8;8) (9;2) (9;3) (9;4) (9;6) (9;7) (9;8)

which is 20

so probability is $\frac{20}{36} = \frac{5}{9} > \frac{1}{2}$

C beats A combinations:

(2;1) (2;2) (3;1) (3;2) (4;1) (4;2) (6;1) (6;2) (6;5) (6;6)
(7;1) (7;2) (7;5) (7;6) (7;7) (8;1) (8;2) (8;5) (8;6) (8;7)

which is 20

so probability is $\frac{20}{36} = \frac{5}{9} > \frac{1}{2}$

1.5

$E = \{1, 2, \dots, 10\}$ $F = \{1, 2, 3, 4\}$

There are 2^{10} possibilities for M.

a.

$1024 - C_4^{10} - C_3^{10} - C_2^{10} - C_1^{10} - C_0^{10} = 1024 - 210 - 120 - 45 - 10 - 1 = 638$

so possibility is $\frac{638}{1024} = \frac{319}{512}$

b. $F = \{1, 2, 3, 4)$

$F^c = \{5, 6, 7, 8, 9, 10\}$

$$P = \frac{C_2^4 \cdot C_3^6}{1024} = \frac{6 \cdot 20}{1024} = \frac{120}{1024} = \frac{15}{128}$$

c.

$$P = \frac{C_0^4 + C_1^4 + C_2^4}{1024} = \frac{1 + 4 + 6}{1024} = \frac{11}{1024}$$