1. How old am I?

When my father was 31 years old, I was 8 years old, but now my father is two times older than me. How old am I now?

Data:

31- my father age, when i was 8 years old,

8- my age, when my father was 31 years old,

x- number of years, when I will be half of my father age,

y- my father age, present

31-8=23 – age difference

$$\begin{cases} 8 + x = \dfrac{y}{2} - my\ father\ is\ two\ times\ older\ than\ me \\ y - (8 + x) = 23 - age\ difference \end{cases}$$

$$\begin{cases} x = \dfrac{y}{2} - 8 \\ y - (8 + x) = 23 \end{cases}$$

$$y - \left(8 - \frac{y}{2} - 8\right) = 23$$

$$y - \frac{y}{2} = 23 \ /* 2$$

$$2y - y = 46 \implies y = 46 - my\ father\ age\ now$$

$$8 + x = \frac{y}{2}$$

$$8 + x = 23 - my\ age\ now\ (x = 15)$$

$$23 * 2 = 46, \qquad 31 + 15 = 46, \qquad 8 + 15 = 23$$

$$-compatibility$$

Answer: I have 23 years now.

2. How many eggs do chicken have?

Three chickens lay three eggs in three days. How many eggs will lay 12 same chickens in 12 days?

Time, in which chickens lay 3 eggs is 3 days, therefore every chicken need 3 days to put one egg. From here:

$$\frac{12}{3} = 4 - number\ of\ cycles\ (because\ we\ have\ 12\ days\ and\ every\ chicken\ need\ 3\ days)$$

$$12 * 4 = 48 - number\ of\ eggs\ (we\ have\ 12\ chicken\ and\ 4\ cycles)$$

Answer: 12 same chickens will lay 48 eggs in 12 days. Every chicken will lay 4 eggs in 12 days.

3. Bouquets of flowers

You have 3 tulips of different colors and 2 roses of different colors. How many different bouquets of 3 flowers can be folded?

5- different flowers,
3- different flowers in bouquets.

$$\binom{5}{3} = \frac{5!}{3!\,(5-3)!} = \frac{5!}{3! * 2!} = \frac{1*2*3*4*5}{1*2*3*1*2} = \frac{120}{12} = 10$$

Check:
Tulips: A,B,C roses: D,E

$$\{A,B,C;\ A,B,D;\ A,B,E;\ A,C,D;\ A,C,E;\ A,D,E;\ B,C,D;\ B,C,E;\ C,D,E;\ E,B,D\}$$
$$- compatibility$$

Answer: We can fold 10 different bouquets of 3 flowers.

4. Vegetables

In the basket there are 8 cucumbers and 7 tomatoes. You cannot look into basket. By 1 attempt you can choose only 1 vegetable. What is the minimum number of attempts you need to guarantee that you get out 1 cucumber **and** 1 tomato?

Answer: We need minimum 9 numbers of attempts, because we have 8 cucumbers, so we can choose only cucumbers by 8 numbers of attempts.

5. Clock

How many times a day does an hour hand intersect with a minute hand in clocks?

$$360°: 12 = 30° - degree\ on\ an\ hour$$

Hour hand:

$$11\frac{55}{60} = 11\frac{11}{12}$$
$$11\frac{11}{12} * 30° = 357{,}499°$$

Minute hand:

$$11 * 30° = 330° - minute\ hand\ will\ be\ on\ the\ 11th\ part\ of\ the\ clock$$

We have this situation twice a day, so:

$$24 - 2 = 22$$

Answer: An hour hand intersects with a minute hand of 22 times.

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