Task. The numerator of a fraction is 6 less than the denominator. If 3 is added to the numerator, the fraction is equal to 2/3. What is the original fraction?

Solution. Let n be the numerator and d be the denominator fo the fraction. Then

$$n = d - 6.$$

Moreover, by assumption

$$\frac{n+3}{d} = \frac{2}{3}$$

Substituting $n = d - 6$ we obtain

$$\frac{d-6+3}{d} = \frac{2}{3} \quad \Rightarrow \quad \frac{d-3}{d} = \frac{2}{3} \quad \Rightarrow \quad 1 - \frac{3}{d} = \frac{2}{3} \quad \Rightarrow$$

$$\Rightarrow \quad \frac{3}{d} = 1 - \frac{2}{3} = \frac{1}{3} \quad \Rightarrow \quad d = 9.$$

Therefore $n = d - 6 = 9 - 6 = 3$.

Thus the fraction is

$$\frac{n}{d} = \frac{3}{9}.$$

Answer. $\frac{3}{9}$.