Exercise 2

$a = 2002 \qquad b = 9 \qquad c = 30$

Задача 1.

Разложить $\frac{2002}{9 \cdot 30} = \frac{2002}{270}$ 2 способами:

1) I способ:

Поиск НОД (2002; 270)

$$2002 = 7 \cdot 270 + 112;$$
$$270 = 2 \cdot 112 + 46;$$
$$112 = 2 \cdot 46 + 20;$$
$$46 = 2 \cdot 20 + 6;$$
$$20 = 3 \cdot 6 + 2;$$
$$6 = 3 \cdot 2$$

НОД = 2; Ответ: [7; 2; 2; 2; 3; 3]

2) II способ:

$$\frac{2002}{270} = 7 + \frac{112}{270} = 7 + \frac{1}{\left(\frac{270}{112}\right)} = 7 + \frac{1}{2 + \frac{46}{112}} = 7 + \frac{1}{2 + \frac{1}{\left(\frac{56}{23}\right)}} =$$

$$= 7 + \frac{1}{2 + \frac{1}{2 + \frac{10}{23}}} = 7 + \frac{1}{2 + \frac{1}{2 + \frac{1}{\left(\frac{23}{10}\right)}}} = 7 + \frac{1}{2 + \frac{1}{2 + \frac{1}{2 + \frac{3}{10}}}} = 7 + \frac{1}{2 + \frac{1}{2 + \frac{1}{2 + \frac{1}{\left(\frac{10}{3}\right)}}}} =$$

$$= 7 + \cfrac{1}{2 + \cfrac{1}{2 + \cfrac{1}{2 + \cfrac{1}{3 + \cfrac{1}{3}}}}}$$

Ответ: [7; 2; 2; 2; 3; 3]

Задание 2

$$\sqrt{b \cdot c} = \sqrt{9 \cdot 30} = \sqrt{270} =$$

$$\sqrt{270} = 16 + \sqrt{270} - 16 = 16 + \cfrac{1}{\left(\cfrac{1}{(\sqrt{270} - 16)}\right)} =$$

$$= 16 + \cfrac{1}{\left(\cfrac{\sqrt{270} + 16}{270 - 256}\right)} = 16 + \cfrac{1}{\left(\cfrac{\sqrt{270} + 16}{14}\right)} =$$

$$= 16 + \cfrac{1}{2 + \cfrac{\sqrt{270} - 12}{14}} = 16 + \cfrac{1}{2 + \cfrac{1}{\left(\cfrac{14}{\sqrt{270} - 12}\right)}} =$$

$$= 16 + \cfrac{1}{2 + \cfrac{1}{\left(\cfrac{14(\sqrt{270} + 12)}{270 - 144}\right)}} = 16 + \cfrac{1}{2 + \cfrac{1}{\left(\cfrac{14(\sqrt{270} + 12)}{126}\right)}} =$$

$$= 16 + \cfrac{1}{2 + \cfrac{1}{\left(\cfrac{\sqrt{270} + 12}{9}\right)}} = 16 + \cfrac{1}{2 + \cfrac{1}{3 + \cfrac{\sqrt{270} - 15}{9}}} =$$

$$= 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{\left(\frac{9}{\sqrt{270} - 15}\right)}}} = 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{\left(\frac{9(\sqrt{270} + 15)}{45}\right)}}} =$$

$$= 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{\left(\frac{\sqrt{270} + 15}{5}\right)}}} = 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{6 + \frac{\sqrt{270} - 15}{5}}}} =$$

$$= 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{6 + \frac{1}{\frac{5(\sqrt{270} + 15)}{45}}}}} = 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{6 + \frac{1}{\left(\frac{\sqrt{270} + 15}{9}\right)}}}} =$$

$$= 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{6 + \frac{1}{3 + \frac{\sqrt{270} - 12}{9}}}}} = 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{6 + \frac{1}{3 + \frac{1}{\frac{9(\sqrt{270} + 12)}{126}}}}}} =$$

$$= 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{6 + \frac{1}{3 + \frac{1}{\left(\frac{\sqrt{270} + 12}{14}\right)}}}}} = 16 + \frac{1}{2 + \frac{1}{3 + \frac{1}{6 + \frac{1}{3 + \frac{1}{2 + \frac{\sqrt{270} - 16}{14}}}}}} =$$

$$=16+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{\frac{14(\sqrt{270}+16)}{270-256}}}}}}}=16+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{(\sqrt{270}+16)}}}}}}$$

~~Ответ~~

$$=16+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{(\sqrt{270}-16)+32}}}}}}=$$

$$=16+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{6+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{32+\cfrac{1}{\left(\frac{1}{\sqrt{270}-16}\right)}}}}}}}$$

Ответ: $[16;\overline{2;3;6;3;2;32}]$