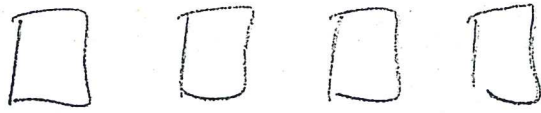


3E

3. 2. 1

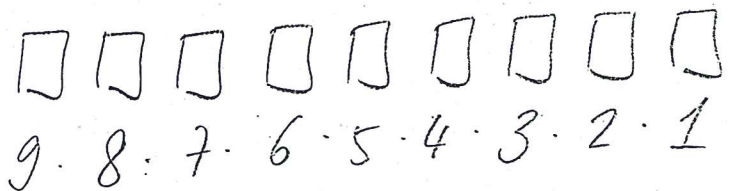


$$4 \cdot 3 \cdot 2 \cdot 1 = 24$$

3. 2. 2

$$\frac{\quad | \quad |}{3 \cdot 2 \cdot 1} = 6$$

3. 2. 3



On a 362 880 possibilités.

$$\begin{aligned} \text{Nombre de secondes: } 362\,880 \cdot 5 &= 1\,814\,400 \text{ s} \\ &= 504 \text{ h} \end{aligned}$$

⇒ Il faudrait 3 semaines

3.2.4

3E

$$a) 2! = 2 \cdot 1 = 2$$

$$b) 3! = 3 \cdot 2 \cdot 1 = 6$$

$$c) 10! = 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 3\,628\,800$$

$$d) 2! \cdot 3! = 2 \cdot 6 = 12$$

$$e) 5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 20 \cdot 6 = 120$$

$$f) 50! = \begin{array}{r} 30\ 414\ 093\ 201\ 713\ 378\ 043\ 642\ 608 \\ 166\ 064\ 768\ 844\ 377\ 641\ 568\ 960 \\ 512\ 000\ 000\ 000\ 000 \end{array}$$

$$g) 6! = 6 \cdot 5! = 6 \cdot 120 = 720$$

$$h) 100! \approx 9,33262154439441527 \cdot 10^{157}$$

$$i) 1000! \approx 4,0238726 \cdot 10^{2567}$$

3.2.5

3E

$$a) \frac{12!}{9!} = \frac{12 \cdot 11 \cdot 10 \cdot \cancel{9!}}{\cancel{9!}} = 12 \cdot 11 \cdot 10 = 1320$$

$$b) \frac{11!}{3!2!4!} = \frac{11 \cdot 10 \cdot \overset{3}{\cancel{9}} \cdot \overset{4}{\cancel{8}} \cdot 7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{3!} \cdot \cancel{2!} \cdot \cancel{4!}} = 11 \cdot 10 \cdot 3 \cdot 2 \cdot 7 \cdot 6 \cdot 5$$
$$= 138600$$

$$c) \frac{12!}{8! \cdot 4!} = \frac{\overset{3}{\cancel{12}} \cdot 11 \cdot \overset{5}{\cancel{10}} \cdot \overset{3}{\cancel{9}} \cdot \cancel{8!}}{\cancel{8!} \cdot \cancel{4!} \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{2}} \cdot 1} = 3 \cdot 11 \cdot 5 \cdot 3$$

$$= 495$$

$$d) \frac{100!}{98!5!} = \frac{100 \cdot 99 \cdot \cancel{98!}}{\cancel{98!} \cdot 5!} = \frac{\overset{5}{\cancel{100}} \cdot \overset{33}{\cancel{99}}}{\cancel{5!}} = \frac{165}{2}$$

$$e) \frac{n!}{(n-2)!} = \frac{n \cdot (n-1) \cdot \cancel{(n-2)!}}{\cancel{(n-2)!}} = n(n-1) = n^2 - n$$

$$f) \frac{(n+2)(n+1)(n)(\cancel{n-1})!}{(\cancel{n-1})!} = n \cdot (n+1)(n+2)$$
$$= n^3 + 3n^2 + 2n$$