

الأعداد الجذرية

التمرين 1

أتمم ب : = و ≠

$$\frac{2}{3} \dots \frac{6}{4} ; \frac{2}{10} \dots \frac{20}{100} ; \frac{6}{10} \dots \frac{4}{5} ; \frac{5,1}{10} \dots \frac{51}{100} ; \frac{9}{10} \dots \frac{18}{20}$$
$$\frac{1}{1000} \dots \frac{2}{2000} ; \frac{8}{12} \dots \frac{4}{6} ; \frac{4}{100} \dots \frac{40}{10} ; \frac{7}{14} \dots \frac{1}{2}$$

التمرين 2

وحد مقامات الأعداد التالية :

$$\frac{30}{18} \text{ و } \frac{10}{9} \quad \frac{3}{5} \text{ و } \frac{7}{10} \quad \frac{1}{2} \text{ و } \frac{3}{4}$$
$$\frac{5}{6} \text{ و } \frac{2}{3} \quad \frac{5,1}{5} \text{ و } \frac{10,2}{10} \quad \frac{9,4}{2} \text{ و } \frac{29}{6}$$

التمرين 3

قارن الأعداد التالية :

$$\frac{7}{9} \text{ و } \frac{7,4}{9} \quad \text{،} \quad \frac{4}{100} \text{ و } \frac{40}{100} \quad \text{،} \quad \frac{18}{17} \text{ و } \frac{18}{17}$$
$$\frac{59}{18} \text{ و } \frac{10}{3} \quad \text{،} \quad \frac{3}{5} \text{ و } \frac{7}{10} \quad \text{،} \quad \frac{2}{100} \text{ و } \frac{19}{1000}$$
$$6,5 \text{ و } \frac{13}{2} \quad \text{،} \quad \frac{9}{4} \text{ و } 2 \quad \text{،} \quad \frac{5}{6} \text{ و } \frac{2}{3} \quad \text{،} \quad \frac{1}{2} \text{ و } \frac{3}{4}$$

التمرين 4

أختزل ما يلي :

$$\frac{27}{18} \quad \text{،} \quad \frac{42}{16} \quad \text{،} \quad \frac{12}{144} \quad \text{،} \quad \frac{465}{225} \quad \text{،} \quad \frac{63}{27}$$
$$\frac{812}{456} \quad \text{،} \quad \frac{2006}{206} \quad \text{،} \quad \frac{225}{360} \quad \text{،} \quad \frac{121}{165} \quad \text{،} \quad \frac{12}{144}$$

التمرين 5

أحسب ما يلي :

$$\left(\frac{-7}{6}\right) + \left(\frac{-5}{4}\right) ; \left(-\frac{6}{7}\right) + 3 ; -\left(\frac{-3}{4}\right) + \frac{-1}{5} ; \left(\frac{-9}{2}\right) + \left(\frac{-2}{11}\right) ; \left(-\frac{3}{11}\right) + \frac{1}{2} ; \frac{1}{2} + \frac{2}{3}$$
$$\left(\frac{7}{-9}\right) + \left(\frac{-2}{15}\right) ; \frac{9}{8} + \left(\frac{5}{-12}\right) ; \left(\frac{1}{-3}\right) + \left(\frac{-7}{10}\right) ; -\left(\frac{-5}{-10}\right) + \left(\frac{3}{-6}\right) ; \left(\frac{1}{-2}\right) + \frac{1}{5}$$
$$\left(\frac{-1}{7}\right) - \left(\frac{3}{-5}\right) ; \frac{19}{20} - \left(\frac{-4}{30}\right) ; 5 - \frac{14}{24} ; \left(\frac{-5}{7}\right) - \frac{2}{3} ; \frac{3}{5} - \frac{2}{7}$$
$$\left(\frac{1}{-2}\right) - \left(\frac{-5}{3}\right) ; \left(\frac{-21}{-16}\right) - \left(\frac{25}{-24}\right) ; -\left(\frac{-6}{-8}\right) - \left(\frac{-8}{-6}\right) ; \left(\frac{14}{-10}\right) - \left(\frac{-10}{-14}\right)$$

## التمرين 6

أحسب ما يلي :

$$\begin{aligned} & \frac{5}{10} + \left(\frac{48}{-100}\right) - \left(\frac{-3}{10}\right) ; \quad \frac{19}{100} + \left(\frac{-26}{100}\right) + \frac{51}{100} ; \quad \frac{1}{2} + \frac{1}{3} + \frac{1}{5} ; \quad \frac{1}{2} + \frac{2}{3} + \frac{5}{6} \\ & \left(\frac{2}{-3}\right) - \left(\frac{1}{-4}\right) - \left(\frac{-3}{-2}\right) ; \quad \left(\frac{-1}{3}\right) - \frac{4}{5} + \left(\frac{7}{-2}\right) ; \quad \left(\frac{-4}{3}\right) - \left(\frac{1}{-6}\right) + \left(\frac{-7}{-12}\right) \\ & \left(\frac{7}{12} - \frac{1}{6}\right) - \left(\frac{3}{4} - \frac{1}{3}\right) ; \quad \frac{19}{4} - \left[\frac{1}{2} - \left(\frac{3}{8} - \frac{1}{4}\right)\right] ; \quad \frac{4}{7} - \left(\frac{6}{7} - \frac{5}{7}\right) + \frac{1}{7} \\ & \frac{24}{15} - \left[-\left(\frac{-2}{3}\right) - \left(\frac{11}{-5} - 2\right)\right] ; \quad -\frac{14}{30} - \left(\frac{-1}{6} - \left(\frac{1}{-5}\right)\right) ; \quad \frac{3}{10} - \left(\frac{97}{100} - 0,8\right) \\ & \left(\frac{1}{2}\right) - \left(\frac{2}{-3}\right) + \left(\frac{-3}{-4}\right) - \left(\frac{-4}{5}\right) ; \quad -\left(\frac{-25}{42} - \frac{2}{-7}\right) - \frac{5}{3} ; \quad \left(\frac{-75}{10} - 3\right) - \left(5 - \frac{43}{-10}\right) \end{aligned}$$

## التمرين 7

أحسب ما يلي :

$$\begin{aligned} & \left(\frac{-2}{5}\right) \times \frac{9}{5} ; \quad 9 \times \frac{-4}{5} ; \quad \frac{7}{11} \times 4 ; \quad 7 \times \frac{4}{11} ; \quad \frac{4}{7} \times \frac{2}{3} ; \quad \frac{2}{7} \times \frac{4}{3} \\ & \left(\frac{-5}{2}\right) \times \left(\frac{2}{-3}\right) ; \quad -\left(\frac{-5}{-7}\right) \times \left(\frac{-15}{-2}\right) ; \quad \left(\frac{-11}{-4}\right) \times \left(\frac{-9}{-13}\right) ; \quad \left(\frac{7}{-10}\right) \times \left(\frac{-11}{-3}\right) ; \quad \left(\frac{-7}{6}\right) \times \left(\frac{5}{-9}\right) \\ & \left(\frac{-2}{-11}\right) \times \left(\frac{-5}{-6}\right) \times \left(\frac{-3}{35}\right) ; \quad \left(\frac{-3}{-4}\right) \times \left(\frac{-5}{-2}\right) \times \frac{4}{3} ; \quad \left(\frac{2}{-3}\right) \times \left(\frac{-11}{5}\right) \times \left(\frac{-5}{7}\right) \\ & \frac{23}{51} \times \left(\frac{-13}{-19}\right) \times \left(\frac{-7}{9}\right) \times \frac{0}{34} ; \quad \frac{8}{25} \times \frac{77}{6} \times \left(\frac{-20}{88}\right) ; \quad \left(\frac{-4}{15}\right) \times \left(-\left(\frac{-21}{-6}\right)\right) \times \left(\frac{-10}{14}\right) \end{aligned}$$

## التمرين 8

أحسب ما يلي :

$$\begin{aligned} & \left(\frac{8}{-5}\right) \div \left(\frac{4}{-3}\right) ; \quad \left(\frac{-4}{-5}\right) \div \left(\frac{6}{-15}\right) ; \quad \left(\frac{-2}{3}\right) \div \left(\frac{14}{-5}\right) ; \quad \left(\frac{-2}{7}\right) \div \frac{3}{4} ; \quad \frac{7}{11} \div \frac{4}{5} \\ & \left(\frac{-8}{-7}\right) \div (-6) ; \quad -7 \div \left(\frac{10}{-21}\right) ; \quad -\left(\frac{-2}{-11}\right) \div \left(\frac{-6}{-7}\right) ; \quad \left(\frac{-10}{-9}\right) \div \left(\frac{5}{-3}\right) \\ & \frac{-7}{-2} ; \quad \frac{-2}{-7} ; \quad \frac{2}{-5} ; \quad \frac{-5}{-3} ; \quad \frac{-2}{5} \\ & \frac{-7}{-3} ; \quad \frac{-7}{5} ; \quad \frac{2}{7} ; \quad \frac{-5}{-2} ; \quad \frac{7}{2} \end{aligned}$$

### التمرين 9

أحسب ما يلي :

$$B = \left( \frac{5}{-9} + \frac{3}{-4} \right) : \left( \frac{-5}{2} \times \frac{-13}{7} \right) ; \quad A = \left( \frac{-8}{3} - \frac{4}{-11} \right) \div \left( \frac{-9}{2} + \frac{-3}{17} \right) \times \frac{-7}{3}$$

$$D = \frac{\left( \frac{-7}{6} \right) + 5}{\left( \left( \frac{-1}{2} \right) + \left( \frac{3}{-4} \right) \right) + \left( \frac{5}{-7} \right)} ; \quad C = \frac{\frac{1}{2} + \frac{1}{3}}{\frac{1}{4} - \frac{1}{5}}$$

### التمرين 10

بسّط ما يلي :

$$\left( \frac{2a}{b} \right)^3 \times \left( \frac{a^3}{b^2} \right)^{-1} \times \left( \frac{a}{2b} \right)^{-3} , \quad \frac{(a^3)^{-2} \times b^4 \times b^2}{(a^3 \times b^{-3})^{-2}} , \quad \frac{a^2 \times a^3}{a^{-4}} , \quad (a^{-2} \times a)^4 \times (a^5)^{-2}$$
$$\frac{ab^{-4} \times (a^2b^{-1})^3 \times a^{-2}b^3}{a^{-5} \times (ab^{-1})^2 \times (ab)^3} , \quad \frac{3}{a^{-4}} \times \left( \frac{a^3}{b^2} \right)^2 \times 2 \left( \frac{2b^2}{a} \right)^{-2} , \quad \frac{a^{-5} \times b^{-3} \times a^2}{a^{-3} \times (b^{-2})^3}$$

### التمرين 11

أحسب ما يلي :

$$10^{-3} \dots 10^{-1} \dots 10^{-6} , \quad 10^{-4} , \quad 10^5 \dots 10^0 \dots 10^9 \dots 10^7$$

أكتب على شكل  $10^n$  :

$$0,1 \dots 0,000\,01 \dots 1\,000 \dots 0,000\,000\,01 \dots 1\,000\,000\,000$$

$$10^0 \times 10^{-4} , \quad 10^{-2} \times 10^{-7} , \quad 10^{-2} \times 10^5 , \quad 10^8 \times 10^{-3} , \quad 10^5 \times 10^2$$

$$\frac{10^6}{10^6} \dots \frac{10^{-4}}{10^5} \dots \frac{10^0}{10^{-10}} \dots \frac{10^{-7}}{10^{-1}} \dots \frac{10^4}{10^{-5}} \dots \frac{10^{-7}}{10^2} \dots \frac{10^9}{10^8} \dots \frac{10^5}{10^3}$$

$$(10^{25})^0 , \quad (10^{-1})^{-1} , \quad (10^{-9})^2 , \quad (10^{-4})^{-5} , \quad (10^2)^{-3} , \quad (10^4)^{-2} , \quad (10^5)^2 , \quad (10^2)^3$$

### التمرين 12

أكتب على شكل  $10^n$  :

$$\frac{(10^{-5})^6}{(10^4)^{-8}} \dots \frac{10^4 \times 10^{-1} \times 10^{-5}}{10^{-7} \times 10^6 \times 10^{-3}} \dots (10^{-2})^3 \times (10^3)^4 \dots 10^4 \times 10^{-8} \times 10^5$$

$$10^{-2} \times 10^9 \times 10 \times 10^2 \times 10^{-5} \dots \left( \left( (10^{-2})^3 \right)^{-4} \right)^{-1} \dots \frac{10^4}{\frac{10^{-5}}{\frac{10^{-3}}{10^2}}}$$

$$\frac{(10^{-2})^3}{(10^{-1})^4} \times \frac{(10^{-8})^2}{(10^{-5})^3} \dots 10^4 \times \frac{10^6}{10^9} \times \frac{10^{-4}}{10^0} \times \frac{1}{10^5} \dots \frac{10^6}{10^{-2}} \times \frac{10^{-2}}{10^{-5}} \times \frac{10^{-5}}{10^4}$$

$$\left[ \frac{10^{-3}}{10^{-5}} \times \left( \frac{10^1}{10^{-1}} \right)^{-3} \right]^{-5} \quad ,, \quad (10^{-9} \times 10^{-3} \times 10^{14} \times 10 \times 0,1)^{-2}$$

### التمرين 13

أتمم ما يلي :

$$\begin{aligned} \frac{10^{-3}}{10^{\dots}} = 10^{-5} \quad ,, \quad \frac{1}{10^{\dots}} = 10^6 \quad ,, \quad 10^{-5} \times 10^{\dots} \times 10^{-2} = 10^3 \quad ,, \quad 10^4 \times 10^{\dots} = 10^{-1} \\ (10^{\dots})^4 = 10^{12} \quad ,, \quad (10^3)^{\dots} = 10^{-6} \quad ,, \quad \frac{10^{-1} \times 10^5 \times 10^{\dots}}{10^{-3} \times 10^7 \times 10^2} = 10^{-3} \quad ,, \quad \frac{10^{-4} \times 10^9}{10^{\dots} \times 10^{-2}} = 10^8 \\ \frac{10^{-3}}{10^{\dots}} = \frac{10^{-5}}{10^{-9}} \quad ,, \quad 10^{11} \times 10^{\dots} = 10^{-5} \times 10^9 \quad ,, \quad \frac{1}{(10^{-5})^{\dots}} = 10^{15} \quad ,, \quad \left[ (10^{-1})^{-3} \right]^{\dots} = 10^{-9} \end{aligned}$$

### التمرين 14

أعط الكتابة العلمية للأعداد التالية :

$$\begin{aligned} 0,000\ 002\ 64 \quad ,, \quad 1\ 048\ 000\ 000\ 000 \quad ,, \quad 0,000\ 000\ 006 \quad ,, \quad 650\ 000\ 000 \quad ,, \quad 540\ 000\ 000 \\ 64,5 \times 10^8 \quad ,, \quad 0,012\ 500 \times 10^{15} \quad ,, \quad 81\ 50 \times 0\ 000 \times 10^{23} \quad ,, \quad 0,012\ 500 \times 10^{-14} \quad ,, \quad 450 \times 10^6 \\ \frac{3 \times 10^5 \times 2 \times 10^{-2}}{8 \times 10^4} \quad ,, \quad \frac{3 \times 10^5 \times 6 \times 10^3}{2 \times 10^7 \times 4,5 \times 10^2} \quad ,, \quad \frac{5 \times 10^2 \times 0,3 \times 10^{-6}}{25 \times 10^{-5}} \quad ,, \quad \frac{3 \times 10^2 \times 1,2 \times 10^{-5}}{15 \times 10^2} \\ \frac{8 \times 10^{15} \times 15 \times 10^{-6}}{20 \times (10^2)^5} \quad ,, \quad \frac{4 \times 10^6 \times 3,3 \times 10^{-7}}{6 \times 10^3} \quad ,, \quad \frac{5 \times 10^{-3} \times 12 \times 10^4}{3 \times 10^5} \quad ,, \quad \frac{1,5 \times 10^7 \times 4 \times 10^{-5}}{25 \times 10^2} \end{aligned}$$