

## ZENBAKIAK ETA ZENBAKIEN ERABILGARRITASUNA

### a. ZENBAKI MOTAK

$$\Rightarrow \text{ARRAZIONALAK } Q \left\{ \begin{array}{l} \text{OSOAK } Z \left\{ \begin{array}{l} \text{ARRUNTAK } N \rightarrow 0; 3; \frac{12}{3}; \sqrt{25} \\ \text{OSO NEGATIBOAK} \rightarrow -5; -\frac{15}{3}; -\sqrt{9} \end{array} \right. \\ \text{ZATIARIARRAK} \rightarrow 2,32; 12,333\dots; -45,566\dots; \frac{1}{3}; \frac{14}{5}; -\frac{9}{11} \end{array} \right.$$

\* Hamartarrak zehatzak edo periodikoak dira  
\* Zatiariarrak negatiboak izan daitezke

$$\Rightarrow \text{IRRAZIONALAK} \rightarrow \sqrt{2}; \sqrt{5}; \pi; 4,87183\dots; -23,342\dots$$

\* Irrazionalak negatiboak izan daitezke

1) Esan ondorengo zenbakiak zer diren: Arrazionalak ala Irrazionalak.

3, -4,  $\frac{5}{2}$ ,  $-\frac{8}{4}$ ,  $\sqrt{2}$ , -1'347...,  $3'4$ ,  $2'\sqrt{3}$ , -150,  $\pi$ ,  $\sqrt{9}$ ,

Arrazionalak	
Irrazionalak	

Ondo azaldu zergatik dira bata ala bestea.

2) Kokatu zenbaki bakoitza dagokion laukian:

4, 0'56, -5, -0'53,  $\frac{7}{3}$ ,  $-\frac{6}{2}$ , 741,  $10^{-5}$ ,  $\frac{10}{2}$ ,  $\pi$ , 0'562, 1'8342...,  $-\sqrt{3}$

$N$	
$Z$	
$Q$	
Irrazionalak	

3) Osatu:

a) Idatzi arruntak ez diren bi zenbaki oso: \_\_\_\_\_

b) Idatzi arruntak eta osoak diren bi zenbaki: \_\_\_\_\_

c) Idatzi bi zenbaki irrazional: \_\_\_\_\_

d) Idatzi osoak ez diren bi zenbaki arrazional: \_\_\_\_\_

b. HAMARTARRAK ZATIKI ERAN IDATZI

Zenbaki hamartarrak zatiki moduan nola idazten diren **ikasi** behar dut.  
(horretarako aurretik hamartar motak bereiztu behar ditut)

- Adibidez:
- a) Hamartar zehatza  $1,8 = \frac{18}{10} = \frac{9}{5}$
- b) Hamartar periodiko purua  $5,\bar{3} = \frac{53-5}{9} = \frac{48}{9} = \frac{16}{3}$
- c) Hamartar periodiko nahasia  $0,\bar{79} = \frac{79-7}{90} = \frac{72}{90} = \frac{4}{5}$

1) Idatzi zatiki eran ondorengo zenbaki hamartarrak:

- a)  $0,\bar{83}$       b)  $0'15$       c)  $3'\overset{0}{2}3$       d)  $0'621$       e)  $1'\bar{23}$       f)  $0,81818\dots$
- g)  $5'\bar{3}$       h)  $3'63636\dots$       i)  $4'\bar{9}$       j)  $4'9$       k)  $12,6573\dots$       l)  $-2,7$

2) Egin ondorengo eragiketak:

a)  $\frac{2,313131\dots - 5,2}{1,03333\dots} =$

b)  $\frac{0,2727\dots - 4,2}{1,05555\dots} =$

c)  $3,5 \cdot 2,\bar{3} + 0,\bar{3} =$

d)  $\frac{5,\bar{02}}{1,42} =$

e)  $\frac{1,8}{2,0\bar{5} + 2,\bar{3}} =$

c. ERAGIKETAK ZENBAKI ARRAZIONALEKIN

3) Egin ondorengo eragiketak:

$$\text{a) } \frac{2}{5} + \frac{3}{4} \cdot \left[ 1 - \frac{2}{3} \cdot \left( 2 - \frac{1}{5} \right) \right] =$$

$$\text{b) } \left[ \left( \frac{5}{6} + \frac{3}{2} - 1 \right) - 2 \left( \frac{3}{4} - \frac{3}{8} \right) \right] \cdot \left( 2 - \frac{1}{3} \right)^2 =$$

$$\text{c) } \frac{3 + \frac{4}{5} \cdot 2 - \frac{1}{3}}{1 - \frac{2}{3}} =$$

$$\text{d) } 2 : \left( \frac{1}{6} + \frac{1}{2} \right) - 3 : \left( 1 + \frac{1}{2} \right) =$$

$$\text{e) } \frac{\frac{4}{5} - \frac{2}{3} \cdot 7 + \frac{1}{5} \cdot \frac{2}{3}}{\frac{4}{5} - 3} =$$

$$\text{f) } \left( \frac{1}{8} + \frac{2}{5} \right) - 3 \left( \frac{1}{5} - 2 \right) + 4 \cdot \frac{3}{4} - 3 \cdot 2^3 + 6 =$$

$$\text{g) } \frac{3^2 + \frac{1}{4} - \frac{1}{3}}{4} + 5 =$$

d. BERREKETAKBERREKETEN PROPIETATEAK

1. $a^m \cdot a^n = a^{m+n}$	$3^4 \cdot 3^2 = 3^{4+2} = 3^6$	;	$5^7 = 5^2 \cdot 5^5$ edo $5^3 \cdot 5^4$ edo...
2. $(a \cdot b)^n = a^n \cdot b^n$	$(3 \cdot 2)^4 = 3^4 \cdot 2^4$	;	$5^7 \cdot 3^7 = (5 \cdot 3)^7$
3. $(a^m)^n = a^{m \cdot n}$	$(5^3)^4 = 5^{12}$	;	$3^{16} = (3^8)^2$ edo $(3^4)^4$ edo $(3^2)^8$ edo...
4. $\frac{a^m}{a^n} = a^{m-n}$	$\frac{2^7}{2^4} = 2^{7-4} = 2^3$	;	$5^8 = \frac{5^{12}}{5^4}$ edo $\frac{5^{10}}{5^2}$ edo...
5. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	$\left(\frac{3}{5}\right)^4 = \frac{3^4}{5^4}$	;	$\frac{2^5}{3^5} = \left(\frac{2}{3}\right)^5$
6. $a^0 = 1$	$7^0 = 1$	;	$13^0 = 1$
7. $a^{-n} = \frac{1}{a^n}$	$3^{-5} = \frac{1}{3^5}$	;	$\frac{1}{2^3} = 2^{-3}$
8. $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$	$\left(\frac{3}{5}\right)^{-2} = \left(\frac{5}{3}\right)^2$	;	$\left(\frac{7}{3}\right)^5 = \left(\frac{3}{7}\right)^{-5}$

ERNE: Erreparatu erabilitako oinarriak zenbaki lehenak direla. Beraz, ariketa batean lehenak ez diren oinarriak ikustean “biderkagai lehenetan deskonposatu”.

Adibidez:

$$81 = 3^4 \quad ; \quad 12 = 2^2 \cdot 3 \quad ; \quad 6 = 2 \cdot 3$$

## 4) Kalkulatu

a)  $(-5)^4 =$

b)  $-5^2 =$

c)  $5^{-4} =$

d)  $7^0 =$

e)  $(-2)^{-3} =$

f)  $3^{-1} =$

g)  $\left(\frac{3}{5}\right)^{-2} =$

h)  $(-1)^{20} =$

i)  $10^5 =$

j)  $10^{-5} =$

5) Osatu hurrengo taula:

$(-2)^5 =$	$(-2)^{-3} =$	$\left(\frac{1}{2}\right)^{-1} =$	$(-1)^{16} =$	$10^5 =$
$-2^4 =$	$2^{-3} =$	$(-1)^{-1} =$	$(-1)^{21} =$	$10^{-6} =$

6) Laburtu:

$$a) 3^{-2} \cdot 3^5 \cdot 3^2 \cdot 3^0 =$$

$$b) \left(\frac{1}{2}\right)^2 \cdot \left(\frac{1}{2}\right)^3 =$$

$$c) (2^{-3})^0 =$$

$$d) \left[\left(\frac{1}{2}\right)^3\right]^{-1} =$$

$$e) 2^5 \cdot 3^5 =$$

$$f) 3^{-5} : 3^{-2} =$$

$$g) 3^{-5} \cdot 3^{-2} =$$

$$i) \left(\frac{2}{5}\right)^2 : \left(\frac{2}{5}\right)^{-1} =$$

7) Prozedura egokia jarraituz, laburtu:

$$a) \frac{3^2 \cdot [(3^2)^4]^3 \cdot 3^{-6}}{3 \cdot (3^2)^{10}} =$$

$$b) \frac{(2^4 \cdot 2^{-6} \cdot 3^{-2} \cdot 6^4)^3}{(8^3 \cdot 9^{-2})^2} =$$

$$c) [(2^3)^{-1}]^2 + \left(\frac{1}{2} + 1\right)^{-2} =$$

$$d) \left[\frac{5^{-3} \cdot 3^2 \cdot 25}{6^3 \cdot (-9) \cdot 2^{-2}}\right]^3 =$$

$$e) \left[\left(\frac{3}{2}\right)^{-1} + \frac{4}{3}\right]^{-2} + \left(\frac{4}{5}\right)^{-1} =$$

8) Prozedura egokia jarraituz, laburtu:

$$a) \frac{6^2}{2 \cdot 3^3} =$$

$$b) \frac{2^3 \cdot (-3)^2 \cdot 4^2}{6^3 \cdot 9^2} =$$

$$c) \frac{2^{-4} \cdot 4^2 \cdot 3 \cdot 9^{-1}}{2^{-5} \cdot 8 \cdot 9 \cdot 3^2} =$$

$$d) \frac{49 \cdot 7^0 \cdot 7^{-3} \cdot 5^2 \cdot 25}{7 \cdot 35 \cdot (-5)^2 \cdot (-7)^3} =$$

$$e) \frac{27 \cdot 125 \cdot 15}{6^3 \cdot 4^{-2} \cdot 30^2} =$$

9) Jarri = edo  $\neq$

$$a) 2^{xy} \quad 2^x \cdot 2^y$$

$$b) 2^{x-y} \quad 2^x \cdot 2^{-y}$$

$$c) 2^{x+2y} \quad (2^x \cdot 2^y)^2$$

$$d) 2^{x+2y} \quad 2^x \cdot (2^y)^2$$

$$e) 2^{(x-y) \cdot 2} \quad \left( \frac{2^x}{2^y} \right)^2$$

$$f) 2^x + 2^y \quad 2^{x+y}$$

10) Idatzi beste modu batean:

$$a) 2^{y+3} =$$

$$b) a^{-2} =$$

$$c) a^{2x} =$$

$$d) 2^{\frac{5}{2}} =$$

$$e) 2^{x-1} =$$

$$f) a \cdot a^x =$$

$$g) a^{x-y-z} =$$

$$h) a^{x \cdot y \cdot z} =$$

e. ERROAK

GOGORATU  
 $\sqrt[n]{a} = b \Leftrightarrow b^n = a$   
 $\sqrt[n]{a^n} = a$

11) Prozedura egokia jarraituz, kalkulatu:

a)  $\sqrt{81} =$

b)  $\sqrt[3]{125} =$

c)  $\sqrt[5]{32} =$

d)  $\sqrt[3]{-1} =$

e)  $\sqrt{-1} =$

f)  $\sqrt[6]{64} =$

12) Prozedura egokia jarraituz, kalkulatu:

a)  $\sqrt[4]{16} =$

b)  $\sqrt[3]{0'027} =$

c)  $\sqrt[3]{1} =$

d)  $\sqrt[3]{-64} =$

e)  $\sqrt[4]{-16} =$

f)  $\sqrt{2^{10} \cdot a^8} =$

g)  $\sqrt[5]{0} =$

h)  $\sqrt[3]{\frac{3^9 \cdot b^3}{2^6}} =$

i)  $\sqrt[3]{\frac{125}{27}} =$

13) Prozedura egokia jarraituz, kalkulatu:

a)  $\sqrt[4]{3^{16}} =$

e)  $\sqrt{12} =$

b)  $\sqrt[4]{3^{17}} =$

f)  $\sqrt[3]{54} =$

c)  $\sqrt[4]{3^{18}} =$

g)  $\sqrt[4]{80} =$

d)  $\sqrt[4]{3^{100}} =$

h)  $\sqrt[3]{432} =$