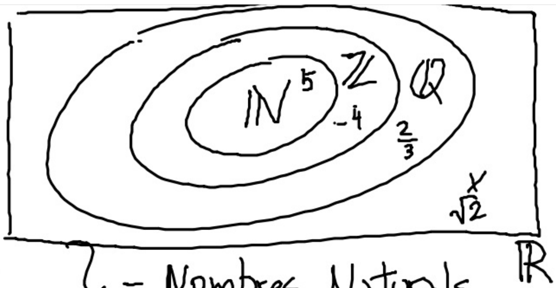
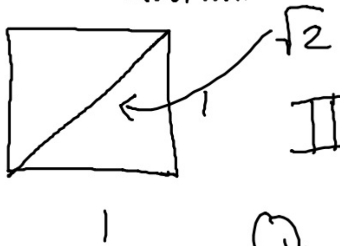
TIPUS de NOMBRES



$\mathbb{N} = \{1, 2, 3, 4, 5, \ldots\}$ = Nombres Naturals

$\mathbb{Z}$ (Zahl) $= \{\ldots, -4, -3, -2, -1, 0, 1, 2, 3, \ldots\}$ = Nombres Enters

$\mathbb{Q}$ Quotient $= \left\{-\frac{2}{3}, \frac{5}{4}, \frac{1.000.000}{7}, \frac{-13}{144}, \ldots\right\}$ = Nombres Racionals o Fraccionaris



$\mathbb{I} = \left\{\sqrt{2}, \sqrt{3}, \frac{2}{\sqrt{5}}, \frac{4}{\sqrt{14}}, \pi, \ldots\right\}$ = Nombres Irracionals = No és poden escriure com a fracció de $\mathbb{Z}$

Qualsevol dels nombres anterior és un nombre real, $\mathbb{R}$

$$\frac{-14}{2} = \frac{-7}{1} = -7$$ nombre enter

$$\frac{7}{2} = 3,5$$

$$\frac{1}{3} = 0,3333\ldots = 0,\widehat{3}$$ Periòdic pur

$$0,25 = \frac{25}{100} = \frac{1}{4}$$ Racional

$$\left.\begin{array}{l} 0,2\widehat{3} = 0,23333\ldots = \text{Periòdic mixt} \\ 0,1234\widehat{5} = 0,12345555\ldots = \text{Periòdic mixt} \\ 0,3\widehat{567} = 0,3567567567\ldots = \text{Periòdic mixt} \end{array}\right\} \text{RACIONALS}$$

EX (a) És RACIONAL o IRRACIONAL?

$5,257101101101\ldots = 5,257\overparen{101}$ com es periòdic $\Rightarrow$ racional

$2,595959\ldots = 2,\overparen{59}$ " $\Rightarrow$ "

$-3,1010010001\,0000\ldots \Leftarrow$ NO HI HA REPETICIÓ, és IRRACIONAL

$4,223345345345\ldots = 4,223\overparen{345}$, es periòdic $\Rightarrow$ racional

(b)

$\sqrt{5}$ Irracional

$\sqrt[3]{6}$ Irracional

$\sqrt{16} = 4$ Racional $\frac{4}{1}$

$\sqrt{24}$ Irracional

$\sqrt[3]{27} = 3 \quad 3^3 = 27$ ✓ Racional

$\sqrt[5]{14}$ Irracional

$\sqrt{\frac{1}{4}} = \frac{\sqrt{1}}{\sqrt{4}} = \frac{1}{2} = 0,5$

(c) Indica el conjunt numèric més petit al qual pertanyen aquests nombres:

$\frac{5}{3}$ Racional, $\mathbb{Q}$ $\quad$ $-0,111\ldots = -0,\overline{1}$ Racional $\mathbb{Q}$

-2 Enter, $\mathbb{Z}$ $\quad$ $2,16666 = 2,1\overline{6}$ = Racional $\mathbb{Q}$

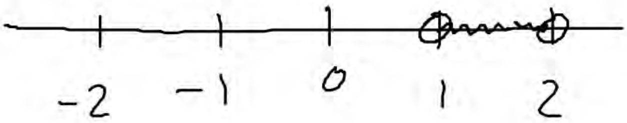
$0,543210123\ldots$ Irracional $\quad$ $0,31415926535\ldots$

Intervals

$$(a,b) = \{x \overset{\text{pertànyer}}{\in} \mathbb{R} \overset{\text{tal que}}{:} a < x < b\}$$

$\leq$

$\geq$

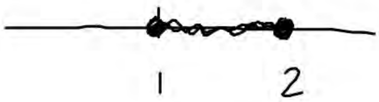


$\mathbb{R}$

$(1,2) = \,]1,2[$

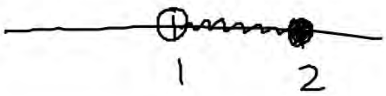
$(1,2)$ interval obert

$[1,2]$



interval tancat $[1,2]$

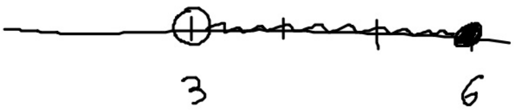
$(1,2]$



interval semiobert o semitancat

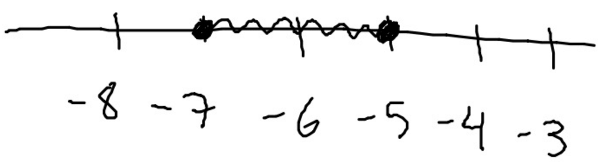
EXEMPLES

(a) Escriu els intervals associats:



$]3, 6]$

$(3, 6]$



$[-7, -5]$

(b) Digues si les següents igualtats són vertaderes o falses, i escriu per què:

$\{x \in \mathbb{R} : -4 \leq x < 1\} = [-4, 1]$ Fals, $[-4, 1)$

$\{x \in \mathbb{R} : 6 < x < 10\} = (6, 10)$ Vertader ✓

EXERCICI PACFGS*

Digues si és CERT o FALS i escriu per què:

(a) $\sqrt{3} \in \mathbb{Q}$ (nombres racionals) FALS, perquè $\sqrt{3}$ no és exacte, no es pot escriure com a fracció

(b) $[2,3] = \{x \in \mathbb{R} : 2 < x < 3\}$

FALS, ja que havia de ser l'interval $(2,3)$ obert

(c) $\sqrt[3]{\sqrt{8}} = \sqrt[5]{8}$ $\cancel{=}$ FALS

$8^{\frac{1}{2}}$ $=\sqrt[3]{8^{\frac{1}{2}}} = 8^{\frac{1}{2\cdot 3}} = 8^{\frac{1}{6}} = \sqrt[6]{8}$

(d) $\underset{\shortparallel}{\sqrt{9}} \in \mathbb{I}$ (irracionals)

$3 = \frac{3}{1}$ és racional FALS

ALTRA FORMA

$\sqrt[6]{8} \neq \sqrt[5]{8}$ FALS

RECORDATORI

$2^3 \cdot 2^5 = 2^8$ $\quad \frac{2^7}{2^4} = 2^3$

$\sqrt[3]{2^4} = 2^{\frac{4}{3}}$

$\sqrt[7]{5^3} = 5^{\frac{3}{7}}$ $\quad (2^5)^7 = 2^{35}$

$a^0 = 1$

$$\sqrt[\frac{1}{2}]{2^3} = 2^{\frac{3}{\frac{1}{2}}} = 2^6$$

EXERCICIS

$$\frac{3}{1} : \frac{1}{2} = \frac{6}{1} = 6$$

Op. NOMBRES ENTERS $2 - 3 \cdot 4 - 5 \cdot (4 - 7)$

OP. FRACCIONS $\frac{2}{7} - \frac{5}{14} \cdot \frac{1}{5}$

Intervals

Op. amb radicals

Recordatori

$$(a \cdot b)^m = a^m \cdot b^m$$

$$(a \cdot b \cdot c)^m = a^m \cdot b^m \cdot c^m$$

$$a^{-n} = \frac{1}{a^n} \qquad x^{-3} = \frac{1}{x^3}$$

Ex. $5^{-2} = \frac{1}{5^2}$, $2^{-3} = \frac{1}{2^3}$

FALS $\frac{x^2}{2x^5} = \frac{1}{2} x^{-3} = \frac{1}{2} \cdot \frac{1}{x^3} = \frac{1}{2x^3}$

1) Simplifica:

a) $$\frac{(2x^2y^3)^3}{3xy} = \frac{2^3 \cdot (x^2)^3 \cdot (y^3)^3}{3xy} = \frac{8x^6y^9}{3xy} = \frac{8}{3}x^5y^8$$

b) $$\frac{(3x^3z)^4}{(2xyz)^2} = \frac{3^4 \cdot (x^3)^4 \cdot z^4}{2^2 \cdot x^2y^2z^2} = \frac{81 \cdot x^{12} \cdot z^4}{4 \cdot x^2y^2z^2} = \frac{81}{4}\frac{x^{10}}{y^2}z^2$$

$$= \frac{81}{4} x^{10} y^{-2} z^2$$

$$a^{-n} = \frac{1}{a^n}$$

2. Expressa en forma de potència:

$$\sqrt{2^3} \qquad \sqrt[5]{x^2} \qquad \sqrt[5]{\left(\frac{3}{5}\right)^{-2}} \qquad \sqrt[3]{\frac{1}{2^4}}$$

$$2^{\frac{3}{2}} \qquad x^{\frac{2}{5}}$$

$$\left(\frac{3}{5}\right)^{-\frac{2}{5}} = \frac{1}{\left(\frac{3}{5}\right)^{\frac{2}{5}}} = \left(\frac{5}{3}\right)^{\frac{2}{5}}$$

$$\sqrt[3]{\frac{1}{2^4}} = \left(\frac{1}{2}\right)^{4/3}$$

$$a^{-n} = \frac{1}{a^n}$$

EX

TRUC

$$\left(\frac{4}{\pi}\right)^{-\frac{5}{4}} = \left(\frac{\pi}{4}\right)^{\frac{5}{4}}$$

3. Expressa com a radicals:

$2^{\frac{1}{4}}$ $\quad 3^{\frac{2}{3}}$ $\quad \left(\frac{1}{3}\right)^{-\frac{3}{2}}$ $\quad (xy^3)^{\frac{3}{7}}$

$\sqrt[4]{2}$ $\quad \sqrt[3]{3^2}$ $\quad \sqrt{\left(\frac{1}{3}\right)^{-3}}$ $\quad \sqrt[7]{(xy^3)^3}$

$\sqrt{3^3}$ $\quad \sqrt[7]{x^3y^9}$

FACTORS dins d'un RADICAL

EXEMPLES

a) $\sqrt{50} = \sqrt{25 \cdot 2} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$

$$\boxed{\sqrt[m]{a \cdot b \cdot c} = \sqrt[m]{a} \cdot \sqrt[m]{b} \cdot \sqrt[m]{c}}$$

b) $\sqrt{48} = \sqrt{16 \cdot 3} = 4\sqrt{3}$