(1) **1.1.** • fraccionarios: $\frac{17}{3}$; $\frac{2}{3}$; $\frac{16}{7}$; $-\frac{7}{2}$ (no dan resultado exacto)

• enteros: $-\frac{16}{4} = -4$; $\frac{20}{5} = 4$; $-\frac{25}{5} = -5$

(1) **1.2** a) $\frac{12}{21} = \frac{2\cdot 2\cdot \cancel{3}}{\cancel{3}\cdot 7} = \frac{4}{7}$ b) $\frac{15}{40} = \frac{3\cdot \cancel{5}}{2\cdot 2\cdot 2\cdot \cancel{5}} = \frac{3}{8}$

c) $\frac{18}{24} = \frac{\cancel{2}\cdot 3\cdot \cancel{3}}{2\cdot 2\cdot \cancel{2}\cdot \cancel{3}} = \frac{3}{4}$

(1) **1.3** a) $\frac{28}{35} = \frac{2\cdot 2\cdot \cancel{7}}{5\cdot \cancel{7}} = \frac{4}{5}$ b) $\frac{48}{72} = \frac{2\cdot \cancel{2}\cdot \cancel{2}\cdot 2\cdot \cancel{3}}{\cancel{2}\cdot \cancel{2}\cdot \cancel{2}\cdot 3\cdot \cancel{3}} = \frac{2}{3}$

c) $\frac{54}{72} = \frac{\cancel{2}\cdot 3\cdot \cancel{3}\cdot \cancel{3}}{\cancel{2}\cdot 2\cdot 2\cdot \cancel{3}\cdot \cancel{3}} = \frac{3}{4}$ d) $\frac{84}{96} = \frac{\cancel{2}\cdot \cancel{2}\cdot \cancel{3}\cdot 7}{\cancel{2}\cdot \cancel{2}\cdot 2\cdot 2\cdot 2\cdot \cancel{3}} = \frac{7}{8}$

e) $\frac{75}{150} = \frac{\cancel{5}\cdot \cancel{5}\cdot \cancel{3}}{\cancel{5}\cdot \cancel{5}\cdot \cancel{3}\cdot 2} = \frac{1}{2}$ f) $\frac{208}{240} = \frac{\cancel{2}\cdot \cancel{2}\cdot \cancel{2}\cdot \cancel{2}\cdot 13}{\cancel{2}\cdot \cancel{2}\cdot \cancel{2}\cdot \cancel{2}\cdot 3\cdot 5} = \frac{13}{15}$

→ es menor que la unidad
→ es mayor que la unidad

(1) **1.4** a) $\frac{3}{4} < \frac{4}{3}$ b) $\frac{6}{8} < \frac{7}{8}$ (ambos son octavos y en uno hay más que en el otro).

c) $\frac{3}{5} = \frac{3\cdot 2}{5\cdot 2} = \frac{6}{10}$ (son iguales) $3 < \frac{11}{2}$

$11 \,|\, 2$
$10 \quad 5,5$
0

$5,5 > 3$

o bien: $\frac{3}{1} = \frac{6}{2} < \frac{11}{2}$

(1) **1.5** $\frac{3}{5}$, $\frac{3}{4}$, $\frac{5}{8}$, $\frac{7}{10}$; Pongamos el mismo denominador en todas: $\text{mcm}(5,4,8,10) = 40$

↓ ↓ ↓ ↓

$\frac{24}{40}$ $\frac{30}{40}$ $\frac{25}{40}$ $\frac{28}{40}$; Por tanto, ordenadas quedan

como $\frac{3}{5} < \frac{5}{8} < \frac{7}{10} < \frac{3}{4}$

(1) **2.1** a) $\frac{5}{7}\cdot\left(\frac{2}{5}+1\right) = \frac{5}{7}\cdot\left(\frac{2}{5}+\frac{5}{5}\right) = \frac{5}{7}\cdot\frac{7}{5} = \frac{5\cdot 7}{5\cdot 7} = 1$

b) $\frac{2}{3}\cdot\left(\frac{2}{3}-1\right) = \frac{2}{3}\cdot\left(\frac{2}{3}-\frac{3}{3}\right) = \frac{2}{3}\cdot\left(-\frac{1}{3}\right) = -\frac{2}{9}$

c) $\frac{3}{14} : \left(1 - \frac{5}{7}\right) = \frac{3}{14} : \left(\frac{7}{7} - \frac{5}{7}\right) = \frac{3}{14} : \frac{2}{7} = \frac{3 \cdot 7}{14 \cdot 2} = \frac{3 \cdot \cancel{7}}{2 \cdot \cancel{7} \cdot 2} = \frac{3}{4}$

d) $\left(\frac{2}{3} - \frac{1}{4}\right) : \frac{5}{6} = \left(\frac{8}{12} - \frac{3}{12}\right) : \frac{5}{6} = \frac{5}{12} : \frac{5}{6} = \frac{\cancel{5} \cdot 6}{\cancel{5} \cdot 12} = \frac{6}{12} = \frac{1}{2}$

1) 2.2 a) $\frac{1}{2} - \left(\frac{3}{4} - 1\right) = \frac{1}{2} - \left(\frac{3}{4} - \frac{4}{4}\right) = \frac{1}{2} - \left(-\frac{1}{4}\right) = \frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$

b) $(-3) \cdot \left(\frac{3}{5} - \frac{1}{3}\right) = (-3) \cdot \left(\frac{9}{15} - \frac{5}{15}\right) = (-3) \cdot \frac{4}{15} = -\frac{12}{15} = -\frac{4}{5}$

1) 2.3 a) $3 - \frac{1}{4} \cdot \left(\frac{3}{5} - \frac{2}{15}\right) = 3 - \frac{1}{4} \cdot \left(\frac{9}{15} - \frac{2}{15}\right) = 3 - \frac{1}{4} \cdot \frac{7}{15} = 3 - \frac{7}{60} =$

$= \frac{180}{60} - \frac{7}{60} = \frac{171}{60} = \frac{57}{20}$

b) $\left(\frac{2}{3} - \frac{5}{9}\right) \cdot \left(\frac{3}{4} - \frac{5}{6}\right) = \left(\frac{6}{9} - \frac{5}{9}\right) \cdot \left(\frac{9}{12} - \frac{10}{12}\right) = \frac{1}{9} \cdot \left(-\frac{1}{12}\right) = -\frac{1}{108}$

1) 3.1 $\frac{5}{9} \cdot 216 = \frac{1080}{9} = 120$ km lleva recorridos.

1) 3.2 $\frac{3}{11} \cdot x = 3900$, $x = \frac{11}{3} \cdot 3900 = 14300$ €

1) 3.1

$3{,}52$ decimal exacto

$2{,}\widehat{8}$ decimal periódico puro

$1{,}\widehat{54}$ decimal periódico puro

$\sqrt{3}$ decimal no exacto ni periódico (irracional)

$2{,}7\widehat{3}$ decimal periódico mixto

$3{,}5\widehat{2}$ decimal periódico mixto

$\pi - 2$ decimal no exacto ni periódico (irracional)

2 **1.1.** a) $16^4 : 8^4 = (16:8)^4 = 2^4 = 16$ b) $12^4 : 4^4 = (12:4)^4 = 3^4 = 81$

c) $32^3 : 8^3 = (32:8)^3 = 4^3 = 64$ d) $\frac{75^2}{25^2} = \left(\frac{75}{25}\right)^2 = 3^2 = 9$

e) $\frac{21^3}{7^3} = \left(\frac{21}{7}\right)^3 = 3^3 = 27$ f) $\frac{35^4}{7^4} = \left(\frac{35}{7}\right)^4 = 5^4 = 625$

2 **1.2.** a) $4^3 \cdot 4^4 \cdot 4 = 4^{3+4+1} = 4^8$ b) $(5^6)^3 = 5^{6\cdot 3} = 5^{18}$

c) $\frac{7^6}{7^4} = 7^{6-4} = 7^2$ d) $\frac{15^3}{3^3} = \left(\frac{15}{3}\right)^3 = 5^3$

e) $2^{10} \cdot 5^{10} = (2\cdot 5)^{10} = 10^{10}$ f) $\frac{12^5}{3^5 \cdot 4^5} = \left(\frac{12}{3\cdot 4}\right)^5 = \left(\frac{12}{12}\right)^5 = 1$

2 **1.3** a) $\left(\frac{a}{b}\right)^3 \cdot \frac{b^4}{b^3} = \frac{a^3}{b^3} \cdot \frac{b^4}{b^3} = \frac{a^3 \cdot b^4}{b^6} = \frac{a^3}{b^2}$

b) $\left(\frac{a}{b}\right)^3 \cdot \left(\frac{b}{a}\right)^3 = \frac{a^3 \cdot b^3}{b^3 \cdot a^3} = 1$ c) $\left(\frac{a}{b}\right)^{-3} \cdot \frac{a^4}{b^3} = \left(\frac{b}{a}\right)^3 \cdot \frac{a^4}{b^3} = \frac{\cancel{b^3} a^4}{a \cancel{b^3}} = a^3$

d) $\left(\frac{a}{b}\right)^3 \cdot \left(\frac{a}{b}\right)^{-3} = \frac{a^3}{b^3} \cdot \left(\frac{b}{a}\right)^3 = \frac{a^3 b^3}{b^3 a^3} = 1$

2 **1.4** $0{,}00001 : 10\,000\,000 = 10^{-5} : 10^7 = 10^{-5-7} = 10^{-12} = \frac{1}{10^{12}}$

2 **1.5** a) $\frac{3^4}{3^5} = 3^{4-5} = 3^{-1} = \frac{1}{3}$ b) $5^{-1} = \frac{1}{5}$

c) $a^{-6} = \frac{1}{a^6}$ d) $4^{-1} \cdot 5^{-2} = \frac{1}{4 \cdot 5^2} = \frac{1}{100}$ e) $(3^2)^{-2} = 3^{-4} = \frac{1}{3^4} = \frac{1}{81}$

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

2 **1.6** a) $\frac{1}{a^{-3}} = a^3$ b) $\frac{a^6}{a^8} = a^{6-8} = a^{-2}$ c) $a^2 \cdot a^{-6} = a^{2-6} = a^{-4}$

d) $\frac{1}{a^2 \cdot a^3} = \frac{1}{a^5} = a^{-5}$ e) $\frac{a}{a^3} = a^{1-3} = a^{-2}$ f) $\frac{a^{-4}}{a} = a^{-4-1} = a^{-5}$

2 **1.7** a) $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$ b) $\frac{1}{3^{-2}} = 3^2 = 9$ c) $\left(\frac{1}{5}\right)^{-1} = \left(\frac{5}{1}\right)^1 = 5$

② **1.8** a) $\left(\frac{1}{5}\right)^2 = \frac{1}{25}$ b) $\left(\frac{1}{5}\right)^{-2} = \left(\frac{5}{1}\right)^2 = 25$ c) $\left(\frac{-1}{5}\right)^{-2} = \left(\frac{-5}{1}\right)^2 = 25$

d) $\left(\frac{3}{4}\right)^0 = 1$ e) $\left(\frac{1}{5}\cdot\frac{1}{2}\right)^{-6} = \left(\frac{1}{10}\right)^{-6} = \left(\frac{10}{1}\right)^6 = 10^6 = 1000000$

f) $\left(\frac{1}{2}\right)^6 \cdot \left(\frac{1}{5}\right)^6 = \left(\frac{1}{2}\cdot\frac{1}{5}\right)^6 = \left(\frac{1}{10}\right)^6 = \frac{1}{10^6} = \frac{1}{1000000}$

Pero no olvidemos que existe también la negativa

En los casos de índice par vamos a quedarnos sólo con la solución positiva

② **2.1** a) $\sqrt[3]{8} = \sqrt[3]{2^3} = 2$ b) $\sqrt[5]{32} = \sqrt[5]{2^5} = 2$ c) $\sqrt[3]{27} = \sqrt[3]{3^3} = 3$

d) $\sqrt[4]{16} = \sqrt[4]{2^4} = 2$ e) $\sqrt[4]{81} = \sqrt[4]{3^4} = 3$ f) $\sqrt[3]{125} = \sqrt[3]{5^3} = 5$

g) $\sqrt[3]{1000} = \sqrt[3]{10^3} = 10$ h) $\sqrt[5]{100000} = \sqrt[5]{10^5} = 10$

② **2.2** a) $\sqrt[4]{625} = \sqrt[4]{5^4} = 5$ b) $\sqrt[5]{243} = \sqrt[5]{3^5} = 3$

c) $\sqrt[3]{343} = \sqrt[3]{7^3} = 7$ d) $\sqrt[6]{1000000} = \sqrt[6]{10^6} = 10$

$$\begin{array}{r|l} 28561 & 13 \\ 2197 & 13 \\ 169 & 13 \\ 13 & 13 \\ 1 & \end{array} \qquad \begin{array}{r|l} 10648 & 2 \\ 5324 & 2 \\ 2662 & 2 \\ 1331 & 11 \\ 121 & 11 \\ 11 & 11 \\ 1 & \end{array}$$

e) $\sqrt[6]{64} = \sqrt[6]{2^6} = 2$ f) $\sqrt[7]{128} = \sqrt[7]{2^7} = 2$

g) $\sqrt[4]{28561} = \sqrt[4]{13^4} = 13$ h) $\sqrt[3]{10648} = \sqrt[3]{2^3\cdot 11^3} = \sqrt[3]{(2\cdot 11)^3} = 22$

② **4.1** a) $4 \cdot 10^7 = 40\,000\,000$ b) $5 \cdot 10^{-4} = 0{,}0005$

c) $9{,}73 \cdot 10^8 = 973000000$ d) $8{,}5 \cdot 10^{-6} = 0{,}0000085$

e) $3{,}8 \cdot 10^{10} = 38000000000$ f) $1{,}5 \cdot 10^{-5} = 0{,}000015$

② **4.2** a) $1000 \cdot 100000 = 10^3 \cdot 10^5 = 10^8$ b) $1000 \cdot 0{,}01 = 10^3 \cdot 10^{-2} = 10^{3-2} = 10$

c) $1000 : 0{,}01 = 10^3 : 10^{-2} = 10^{3-(-2)} = 10^{3+2} = 10^5$

d) $1000 : 0{,}000001 = 10^3 : 10^{-6} = 10^{3-(-6)} = 10^{3+6} = 10^9$

e) $1000 \cdot 0{,}000001 = 10^3 \cdot 10^{-6} = 10^{3-6} = 10^{-3}$

f) $0{,}0001 \cdot 0{,}01 = 10^{-4} \cdot 10^{-2} = 10^{-4+(-2)} = 10^{-4-2} = 10^{-6}$

g) $0{,}0001 : 0{,}01 = 10^{-4} : 10^{-2} = 10^{-4-(-2)} = 10^{-4+2} = 10^{-2}$

② **4.3** a) $13\,800\,000 = 1{,}38 \cdot 10^7$ b) $0{,}000005 = 5 \cdot 10^{-6}$

c) $4\,800\,000\,000 = 4{,}8 \cdot 10^9$ d) $0{,}0000173 = 1{,}73 \cdot 10^{-5}$

② **4.4** a) $27\,800\,000 = 2{,}78 \cdot 10^7$ b) $950\,000\,000\,000 = 9{,}5 \cdot 10^{11}$

c) $0{,}00057 = 5{,}7 \cdot 10^{-4}$ d) $0{,}00000000136 = 1{,}36 \cdot 10^{-9}$

② **4.5** a) $150\,000\,000 = 1{,}5 \cdot 10^8$ Km b) $1200000\ l/s = 1{,}2 \cdot 10^6\ l/s$

c) $300\,000\,000\ m/s = 3 \cdot 10^8\ m/s$ d) $5490000000 = 5{,}49 \cdot 10^{10}$ Kg

② **4.6** a) $(3{,}25 \cdot 10^7) \cdot (9{,}35 \cdot 10^{-15}) = 30{,}3875 \cdot 10^{-8} = 3{,}03875 \cdot 10^{-7}$

b) $(5{,}73 \cdot 10^4) + (-3{,}2 \cdot 10^5) = 0{,}573 \cdot 10^5 - 3{,}2 \cdot 10^5 = -2{,}627 \cdot 10^5$

② **4.7** a) $(2{,}5 \cdot 10^7) \cdot (8 \cdot 10^3) = 20 \cdot 10^{10} = 2 \cdot 10^{11}$

b) $(5 \cdot 10^{-3}) : (8 \cdot 10^5) = \frac{5}{8} \cdot \frac{10^{-3}}{10^5} = 0{,}625 \cdot 10^{-8} = 6{,}25 \cdot 10^{-9}$

c) $(7{,}4 \cdot 10^{13}) \cdot (5 \cdot 10^{-6}) = 37 \cdot 10^7 = 3{,}7 \cdot 10^8$

② <u>4.8</u> a) $(2\cdot10^5)\cdot(3\cdot10^{12}) = 2\cdot3\cdot10^5\cdot10^{12} = 6\cdot10^{17}$

b) $(1{,}5\cdot10^{-7})\cdot(2\cdot10^{-5}) = 2\cdot1{,}5\cdot10^{-7}\cdot10^{-5} = 3\cdot10^{-12}$

c) $(3{,}4\cdot10^{-8})\cdot(2\cdot10^{17}) = 2\cdot3{,}4\cdot10^{-8}\cdot10^{17} = 6{,}8\cdot10^{9}$

d) $(8\cdot10^{12}):(2\cdot10^{17}) = \frac{8}{2}\cdot\frac{10^{12}}{10^{17}} = 4\cdot10^{-5}$

e) $(9\cdot10^{-7}):(3\cdot10^{7}) = \frac{9}{3}\cdot\frac{10^{-7}}{10^{7}} = 3\cdot10^{-14}$

f) $(4{,}4\cdot10^{8}):(2\cdot10^{-5}) = \frac{4{,}4}{2}\cdot\frac{10^{8}}{10^{-5}} = 2{,}2\cdot10^{13}$

③ **1.1** a) $\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}, \frac{1}{36}, \frac{1}{49}, \dots$

b) $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \frac{7}{8}, \dots$

c) $3, 6, 12, 24, 48, 96, 192, \dots$

d) $1, 3, 4, 7, 8, 12, 13, 18, \dots$

$+2 \quad +1 \quad +3 \quad +1 \quad +4 \quad +1 \quad +5$

$1{,}2 + 1{,}1 \cdot 7 = 1{,}2 + 7{,}7$

③ **1.2** a) $a_1 = 1{,}2$; $a_2 = 2{,}3$; $a_3 = 3{,}4$; $a_4 = 4{,}5$; ... ; $a_8 = 8{,}9$

$+1{,}1 \quad +1{,}1 \quad +1{,}1$ ... (7 veces)

b) $b_1 = 1$; $b_2 = -3$; $b_3 = 9$; $b_4 = -27$; ... ; $b_8 = -2187$

$\times(-3) \quad \times(-3) \quad \times -3$ ... (7 veces)

$1 \cdot (-3)^7$

③ **1.3**

a) $a_n = \frac{2n-5}{n^2+1}$; $a_1 = \frac{2\cdot 1 - 5}{1^2+1} = \frac{2-5}{1+1} = -\frac{3}{2}$

$a_2 = \frac{2\cdot 2-5}{2^2+1} = \frac{4-5}{4+1} = -\frac{1}{5}$; $a_3 = \frac{2\cdot 3-5}{3^2+1} = \frac{6-5}{9+1} = \frac{1}{10}$

$a_4 = \frac{2\cdot 4-5}{4^2+1} = \frac{8-5}{16+1} = \frac{3}{17}$; $a_{10} = \frac{2\cdot 10-5}{10^2+1} = \frac{20-5}{100+1} = \frac{15}{101}$

b) $b_n = 5 \cdot 2^{n-1}$; $b_1 = 5 \cdot 2^{1-1} = 5 \cdot 2^0 = 5 \cdot 1 = 5$; $b_2 = 5 \cdot 2^{2-1} = 5 \cdot 2 = 10$

$b_3 = 5 \cdot 2^{3-1} = 5 \cdot 2^2 = 5 \cdot 4 = 20$; $b_4 = 5 \cdot 2^{4-1} = 5 \cdot 2^3 = 5 \cdot 8 = 40$;

$b_{10} = 5 \cdot 2^{10-1} = 5 \cdot 2^9 = 5 \cdot 512 = 2560$

c) $c_n = 4 + \frac{5n-5}{2}$; $c_1 = 4 + \frac{5\cdot 1-5}{2} = 4 + \frac{5-5}{2} = 4 + \frac{0}{2} = 4$

$c_2 = 4 + \frac{5\cdot 2-5}{2} = 4 + \frac{10-5}{2} = 4 + \frac{5}{2} = \frac{8}{2} + \frac{5}{2} = \frac{13}{2}$

$c_3 = 4 + \frac{5\cdot 3-5}{2} = 4 + \frac{15-5}{2} = 4 + \frac{10}{2} = 4 + 5 = 9$

$$c_4 = 4 + \frac{5\cdot4-5}{2} = 4 + \frac{20-5}{2} = 4 + \frac{15}{2} = \frac{8}{2} + \frac{15}{2} = \frac{23}{2}$$

$$c_{10} = 4 + \frac{5\cdot10-5}{2} = 4 + \frac{50-5}{2} = 4 + \frac{45}{2} = \frac{8}{2} + \frac{45}{2} = \frac{53}{2}$$

d) $d_n = (-1)^{n+1}\cdot n$; $d_1 = (-1)^{1+1}\cdot 1 = (-1)^2\cdot 1 = 1\cdot1 = 1$

$d_2 = (-1)^{2+1}\cdot 2 = (-1)^3\cdot 2 = -1\cdot 2 = -2$; $d_3 = (-1)^{3+1}\cdot 3 = (-1)^4\cdot 3 = 1\cdot 3 = 3$

$d_4 = (-1)^{4+1}\cdot 4 = (-1)^5\cdot 4 = -1\cdot 4 = -4$; $d_{10} = (-1)^{10+1}\cdot 10 = (-1)^{11}\cdot 10 = -1\cdot 10 = -10$

3 **1.4** a) $a_n = \frac{3n-2}{n}$; $a_5 = \frac{3\cdot5-2}{5} = \frac{15-2}{5} = \frac{13}{5}$;

$a_{10} = \frac{3\cdot10-2}{10} = \frac{30-2}{10} = \frac{28}{10} = \frac{14}{5}$; $a_{100} = \frac{3\cdot100-2}{100} = \frac{300-2}{100} = \frac{298}{100} = \frac{149}{50}$

b) $b_n = \frac{(-2)^n}{5}$; $b_5 = \frac{(-2)^5}{5} = \frac{-32}{5}$; $b_6 = \frac{(-2)^6}{5} = \frac{64}{5}$; $b_7 = \frac{(-2)^7}{5} = \frac{-128}{5}$

c) $c_n = 39 - 17n$; $c_1 = 39 - 17\cdot1 = 39 - 17 = 22$; $c_4 = 39 - 17\cdot4 = 39 - 68 = 29$

$c_{15} = 39 - 17\cdot15 = 39 - 255 = -216$

d) $d_n = (\sqrt{2})^n$; $d_1 = (\sqrt{2})^1 = \sqrt{2}$; $d_6 = (\sqrt{6})^6 = \sqrt[2]{6^{2\cdot3}} = 6^3 = 216$

$d_{20} = (\sqrt{2})^{20} = \sqrt[2]{2^{2\cdot10}} = 2^{10} = 1024$

3 **1.5** a) $a_1 = \frac{1}{3}$; $a_2 = \frac{4}{3}$; $a_3 = \frac{9}{3}$; $a_4 = \frac{16}{3}$; ...

Término general : $a_n = \frac{n^2}{3}$

b) $b_1 = 7$; $b_2 = 14$; $b_3 = 21$; $b_4 = 28$; ...

Término general : $b_n = 7\cdot n$

③ 1.6 a) $a_1 = \frac{1}{5}$, $a_2 = \frac{1}{10}$, $a_3 = \frac{1}{15}$, $a_4 = \frac{1}{20}$, ...

Término general: $a_n = \frac{1}{5 \cdot n}$

b) $b_1 = \frac{1}{2}$, $b_2 = \frac{2}{3}$, $b_3 = \frac{3}{4}$, $b_4 = \frac{4}{5}$, ...

Término general: $b_n = \frac{n}{n+1}$

③ 1.7 a) $a_1 = \frac{0}{2}$, $a_2 = \frac{1}{4}$, $a_3 = \frac{2}{6}$, $a_4 = \frac{3}{8}$, ...

Término general: $a_n = \frac{n-1}{2 \cdot n}$

b) $b_1 = 3$, $b_2 = 6$, $b_3 = 11$, $b_4 = 18$, $b_5 = 27$, ...

Término general: $b_n = n^2 + 2$

c) $c_1 = -1$, $c_2 = 2$, $c_3 = 7$, $c_4 = 14$, $c_5 = 23$, ...

Término general: $c_n = n^2 - 2$

d) $d_1 = 12$, $d_2 = 14$, $d_3 = 16$, $d_4 = 18$, ...

Término general: $d_n = (5 + n) \cdot 2 = 10 + 2n$

e) $e_1 = 25$, $e_2 = 20$, $e_3 = 15$, $e_4 = 10$, ...

Término general: $e_n = 30 - 5n$

f) $f_1 = 6$, $f_2 = 12$, $f_3 = 24$, $f_4 = 48$, ...

Término general: $f_n = 6 \cdot 2^{n-1}$

③ <u>1.8</u> a) 1, −4, 5, −9, 14, −23, …

Ley de recurrencia: $a_n = a_{n-2} - a_{n-1}$; Siguiente término:
$a_7 = a_5 - a_6 = 14 - (-23) = 37$

b) 1, 2, 3, 6, 11, 20, …

Ley de recurrencia: $b_n = b_{n-1} + b_{n-2} + b_{n-3}$

Siguiente término: $b_7 = 20 + 11 + 6 = 37$

c) 1 ; 2 ; 1,5 ; 1,75 ; …

Ley de recurrencia: $c_n = \dfrac{c_{n-1} + c_{n-2}}{2}$

Siguiente término: $c_5 = \dfrac{1{,}5 + 1{,}75}{2} = 1{,}625$

d) 1, 2, 2, 1, 1/2, 1/2, 1

Ley de recurrencia: $d_n = \dfrac{d_{n-1}}{d_{n-2}}$

Siguiente término: $d_8 = \dfrac{1}{1/2} = 1 : \dfrac{1}{2} = 2$

③ <u>2.1</u> I) 3, 10, 17, 24, ... II) −8, −12, −16, −20, ...

III) 14, 11, 8, 5, ... IV) −1,5 ; 0 ; 1,5 ; 3 ; ...

$a_n = -3n+17 \rightarrow$ III $\longrightarrow$ Probando con $n=1$, por ejemplo, enseguida vemos con cuál se corresponde cada una.

$b_n = 7n-4 \longrightarrow$ I

$c_n = 1{,}5n - 3 \longrightarrow$ IV

$d_n = -4n-4 \longrightarrow$ II

③ <u>2.2</u> a) $a_1 = 11$; $d = 3$; término general : $a_n = 11 + (n-1)\cdot 3$;

desarrollando : $a_n = 11 + 3n - 3$; $a_n = 3n - 8$

b) $b_1 = -5$; $d = 2$; término general : $b_n = -5 + (n-1)\cdot 2$;

desarrollando : $b_n = -5 + 2n - 2$; $b_n = 2n - 7$

③ <u>2.3</u> a) $a_2 = -7$; $d = -4$

Primero necesitamos a_1 : $a_1 = a_2 - d = -7 - (-4) = -3$

Término general : $a_n = -3 + (n-1)(-4) = -3 - 4n + 4 = -4n + 1$

b) $b_2 = \frac{3}{2}$; $d = 1$

Primero necesitamos b_1 ; $b_1 = b_2 - d = \frac{3}{2} - 1 = \frac{3}{2} - \frac{2}{2} = \frac{1}{2}$

Término general : $b_n = \frac{3}{2} + (n-1)\cdot\frac{1}{2} = \frac{3}{2} + \frac{n}{2} - \frac{1}{2} = \frac{n}{2} + 1$

③ 2.4 a) $25, 20, 15, 10, \ldots$; $a_n = 25 + (n-1)(-5) = 25 - 5n + 5 = -5n + 20$

$\underbrace{25, 20}_{-5}, \underbrace{\,}_{-5} \underbrace{\,}_{-5} \longrightarrow d = -5$

b) $7, 3, -1, -5, \ldots$; $b_n = 7 + (n-1)(-4) = 7 - 4n + 4 = -4n + 11$

$-4 \quad -4 \quad -4 \longrightarrow d = -4$

c) $-10, -7, -4, -1, \ldots$; $c_n = -10 + (n-1) \cdot 3 = -10 + 3n - 3 = 3n - 13$

$+3 \quad +3 \quad +3 \longrightarrow d = 3$

d) $-8, -12, -16, -20, \ldots$; $d_n = -8 + (n-1)(-4) = -8 - 4n + 4 = -4n - 4$

$-4 \quad -4 \quad -4 \longrightarrow d = -4$

③ 3.1 a) $a_1 = 5$, $r = 2$; $a_6 = 5 \cdot 2^{6-1} = 5 \cdot 2^5 = 5 \cdot 32 = 160$

b) $b_1 = \frac{1}{2}$, $r = -2$; $b_7 = \frac{1}{2} \cdot (-2)^{7-1} = \frac{1}{2} \cdot (-2)^6 = \frac{1}{2} \cdot 64 = 32$

c) $c_1 = 10$, $r = 0{,}1$; $c_5 = 10 \cdot 0{,}1^{5-1} = 10 \cdot 0{,}1^4 = 0{,}001$

d) $d_1 = 15$, $r = \frac{1}{2}$; $d_8 = 15 \cdot \left(\frac{1}{2}\right)^{8-1} = 15 \cdot \left(\frac{1}{2}\right)^7 = 15 \cdot \frac{1}{2^7} = \frac{15}{128}$

③ 3.2 a) $5, 50, 500, 5000, \ldots \rightarrow a_n = 5 \cdot 10^{n-1}$

b) $\frac{2}{3}, \frac{2}{9}, \frac{2}{27}, \frac{2}{81}, \ldots \rightarrow b_n = \frac{2}{3^n} = 2 \cdot \left(\frac{1}{3}\right)^n$

c) $-3, 6, -12, 24, \ldots \rightarrow c_n = -3 \cdot (-2)^{n-1}$

d) $5, \frac{15}{2}, \frac{45}{4}, \frac{135}{8}, \ldots \rightarrow d_n = 5 \cdot \left(\frac{3}{2}\right)^{n-1}$