

- b) $1,33 \cdot 10^3$
 c) $3,66 \cdot 10^{-20}$
 d) $1,26 \cdot 10^3$

- 7 a) $1,89 \cdot 10^{-10}$
 b) $2,40 \cdot 10^{-15}$

- 8 a) $2,5 \cdot 10^{13}$

b) 40 milions de persones = $4 \cdot 10^7$ persones.

$(4 \cdot 10^7) \cdot (2,5 \cdot 10^{13}) = 1 \cdot 10^{21} = 10^{21}$ glòbuls vermells aproximats que tindran 40 milions de persones.

Pàgina 8

- 1 a) $a^{5/6}$ b) $a^{3/2}$
 c) $3^{4/5}$ d) $x^{1/3}$
 e) $n^{1/2}$ f) $x^{-2/3}$
 g) $a^{-3/2}$ h) $a^{-2/3}$
 i) $x^{-1/2}$

- 2 a) $\sqrt[5]{3^4}$ b) $\sqrt{2}$
 c) $\sqrt[4]{a^3}$ d) $\frac{1}{\sqrt{x}}$
 e) $\frac{1}{\sqrt[4]{a^3}}$ f) $\sqrt{n}$
 g) $\frac{1}{\sqrt[3]{x^2}}$ h) $\frac{1}{\sqrt{5}}$
 i) $\frac{1}{\sqrt[5]{3^4}}$

- 3 a) $x^2 \sqrt[3]{x}$ b) x^2
 c) $x \sqrt{x^4}$ d) $a \sqrt{a}$
 e) $\sqrt[3]{2^4} = 2 \sqrt[3]{2}$ f) $\sqrt[3]{3^4} = 3 \sqrt[3]{3}$

- g) $\sqrt{2^5} = 2^2 \sqrt{2} = 4\sqrt{2}$ h) $\sqrt{3^5} = 9\sqrt{3}$
 i) $\sqrt[5]{2^{10}} = 2^2 = 4$

- 4 a) $a x \sqrt{a}$
 b) $x y^2 \sqrt[3]{x^2}$
 c) $3x y \sqrt{x}$
 d) $\sqrt{2 a^4} = a^2 \sqrt{2}$
 e) $\sqrt[3]{-3^4 a^3} = -3a \sqrt[3]{3}$
 f) $\sqrt{\frac{25}{9}} = \frac{5}{3}$
 g) $\sqrt[3]{3^3 a^4} = 3a \sqrt[3]{a}$
 h) $\sqrt{16(x+1)} = 4\sqrt{x+1}$
 i) $\sqrt{25x^2(x+1)} = 5x\sqrt{x+1}$

Pàgina 9

- 5 a) $\sqrt[12]{x^9}$ i $\sqrt[12]{x^8}$ b) $\sqrt[4]{3^2}$ i $\sqrt[4]{3^5}$

- 6 a) $\sqrt{2} = \sqrt[12]{2^6} = \sqrt[12]{64}$
 $\sqrt[3]{3} = \sqrt[12]{3^4} = \sqrt[12]{81}$
 $\sqrt[4]{4} = \sqrt[12]{4^3} = \sqrt[12]{64}$ } $\sqrt{2} = \sqrt[4]{4} < \sqrt[3]{3}$

- b) $\sqrt[3]{7} = \sqrt[15]{7^5} = \sqrt[15]{16807}$
 $\sqrt[5]{25} = \sqrt[15]{25^3} = \sqrt[15]{15625}$ } $\sqrt[5]{25} < \sqrt[3]{7}$

- c) $\sqrt[6]{6561}$
 $\sqrt[3]{81} = \sqrt[6]{81^2} = \sqrt[6]{6561}$
 $\sqrt{18} = \sqrt[6]{18^3} = \sqrt[6]{5832}$ } $\sqrt{18} < \sqrt[3]{81} = \sqrt[6]{6561}$

- 7 a) $x^{1/6} \cdot x^{1/6} = x^{2/6} = x^{1/3} = \sqrt[3]{x}$
 b) $\sqrt[3]{n^2}$

$$c) 3\sqrt{3 \cdot 5^2} \cdot 4\sqrt{2^4 \cdot 3} = 15\sqrt{3} \cdot 16\sqrt{3} = 720$$

$$d) \sqrt{\frac{324}{400}} = \sqrt{\frac{81}{100}} = \frac{9}{10}$$

$$e) (\sqrt[8]{2})^4 = 2^{4/8} = 2^{1/2} = \sqrt{2}$$

$$f) \sqrt[6]{\frac{x^9 y^6}{z^{18}}} : \frac{x^4 y^6}{z^8} = \sqrt[6]{\frac{x^9 y^6 z^8}{x^4 y^6 z^{18}}} = \sqrt[6]{\frac{x^5}{z^{10}}} = \frac{1}{z} \sqrt[6]{\frac{x^5}{z^4}}$$

$$g) \sqrt[6]{x^4 \cdot \frac{1}{x^8} \cdot x^{15}} = \sqrt[6]{x^{11}} = x \sqrt[6]{x^5}$$

$$h) (\sqrt[4]{2^3})^3 = \sqrt[4]{2^9} = 2^2 \sqrt[4]{2} = 4\sqrt[4]{2}$$

$$i) \frac{5}{3} a^{-4/3} \cdot a^{1/3} = \frac{5}{3a}$$

$$j) \frac{a^{-1/2} \cdot a^{3/4}}{a^{1/2} \cdot a^{2/3}} = a^{-11/12} = \frac{1}{\sqrt[12]{a^{11}}}$$

$$k) \frac{a^{-4} \cdot a^{-1/3} \cdot a^{1/3}}{3 \cdot a^{1/2}} = \frac{1}{3 \cdot a^{9/2}} = \frac{1}{3\sqrt{a^9}} = \frac{1}{3a^4\sqrt{a}}$$

$$l) (\sqrt[8]{3^7})^2 : \sqrt[4]{3^3} = \sqrt[4]{3^7} : \sqrt[4]{3^3} = \sqrt[4]{3^4} = 3$$

$$m) \left(\frac{a^{2/3}}{a^{1/2}} \right)^2 : \frac{1}{a^2} = a^{1/3} : a^{-2} = a^{7/3} = a^2 \sqrt[3]{a}$$

$$n) a^{-2/3} : a^{1/6} = a^{-5/6} = \frac{1}{\sqrt[6]{a^5}}$$

$$o) \left(\frac{\sqrt[3]{2^3} \cdot \sqrt{25}}{\sqrt{2}} \right)^3 : \left(\frac{2 \cdot 2^2 \sqrt{2}}{\sqrt{2}} \right)^3 = (2^3)^3 = 2^9 = 512$$

$$p) \frac{1}{\sqrt{3}} \cdot \sqrt[3]{3^2} \cdot \frac{\sqrt{3^3}}{2} = \frac{3^{5/3}}{2} = \frac{\sqrt[3]{3^5}}{2} = \frac{3\sqrt{9}}{2}$$

$$q) \frac{8 \cdot 2\sqrt{2} \cdot \sqrt[3]{2}}{4} = 4 \cdot 2^{1/2} \cdot 2^{1/3} = 4 \cdot 2^{5/6} = 4\sqrt[6]{2^5} = 4\sqrt[6]{32}$$

$$r) \frac{5^{1/3} \cdot 5^{3/2}}{5 \cdot 2} = \frac{5^{11/6}}{5 \cdot 2} = \frac{5 \sqrt[6]{5^5}}{5 \cdot 2} = \frac{\sqrt[6]{3125}}{2}$$

Pàgina 10

$$8) a) 9\sqrt{3^3} + 2\sqrt{3} - 8\sqrt{2^2 \cdot 5^2 \cdot 3} - 4\sqrt{3} = \\ = 27\sqrt{3} + 2\sqrt{3} - 80\sqrt{3} - 4\sqrt{3} = -55\sqrt{3}$$

$$b) \frac{3\sqrt{3^2 \cdot 5}}{2} - \frac{\sqrt{2^2 \cdot 5}}{3} + 4\sqrt{5^3} - \sqrt{5} = \\ = \frac{9\sqrt{5}}{2} - \frac{2\sqrt{5}}{3} + 20\sqrt{5} - \sqrt{5} = \frac{137\sqrt{5}}{6}$$

$$c) 8\sqrt{2^3} - 5\sqrt{2} + 4\sqrt{2^2 \cdot 5} - 12\sqrt{5} + 3\sqrt{3^2 \cdot 2} = \\ = 16\sqrt{2} - 5\sqrt{2} + 8\sqrt{5} - 12\sqrt{5} + 9\sqrt{2} = \\ = 20\sqrt{2} - 4\sqrt{5}$$

$$d) \sqrt{1+x} - 4\sqrt{16(1+x)} + 3\sqrt{25(1+x)} = \\ = \sqrt{1+x} - 16\sqrt{1+x} + 15\sqrt{1+x} = 0$$

$$e) 8x\sqrt[3]{a^2} - x^2a\sqrt[3]{a^2} = (8x - x^2a)\sqrt[3]{a^2}$$

$$9) a) 9 - 2 = 7$$

$$b) 3 - \sqrt{2} + 3\sqrt{2} - 2 = 1 + 2\sqrt{2}$$

$$c) 1 + 2 + 2\sqrt{2} = 3 + 2\sqrt{2}$$

$$d) 3 - 2 = 1$$

$$e) \sqrt{15} + 3 + 2\sqrt{5} + 2\sqrt{3}$$

$$f) 16 - 6 = 10$$

$$g) 3 + 2 - 2\sqrt{6} = 5 - 2\sqrt{6}$$

$$h) 12 + 1 + 4\sqrt{3} = 13 + 4\sqrt{3}$$

Pàgina 11

$$10) a) \frac{3\sqrt{5}}{5}$$

$$b) \frac{4}{\sqrt{3^3}} = \frac{4}{3\sqrt{3}} = \frac{4\sqrt{3}}{9}$$

$$c) \frac{\sqrt{3}}{\sqrt{7}} = \frac{\sqrt{21}}{7}$$

$$d) \frac{\sqrt[3]{4}}{2}$$

$$e) \frac{4\sqrt[3]{4}}{2} = 2\sqrt[3]{4} \quad f) \sqrt{2}$$

$$g) \frac{5\sqrt[5]{5^3}}{5} = \sqrt[5]{125}$$

$$h) \frac{3}{\sqrt[3]{3^2 \cdot 2}} = \frac{3\sqrt[3]{3 \cdot 2^2}}{3 \cdot 2} = \frac{\sqrt[3]{12}}{2}$$

$$i) \frac{1}{x\sqrt{x}} = \frac{\sqrt{x}}{x^2} \quad j) \frac{\sqrt{6}}{3}$$

$$k) \frac{\sqrt[3]{3} \cdot \sqrt{2} \cdot \sqrt{3}}{3} = \frac{\sqrt[6]{3^2 \cdot 2^3 \cdot 3^2}}{3} = \frac{\sqrt[6]{3^4 \cdot 2^3}}{3} = \frac{\sqrt[6]{648}}{3}$$

$$l) \frac{(2+\sqrt{2})\sqrt{2}}{2} = \frac{2\sqrt{2}+2}{2} = \frac{2(\sqrt{2}+1)}{2} = \sqrt{2}+1$$

$$k) \frac{(\sqrt{2}-\sqrt{3})(\sqrt{3}-\sqrt{2})}{3-2} = -5+2\sqrt{6}$$

$$l) \frac{(4+\sqrt{2})(2\sqrt{2}+1)}{8-1} = \frac{8+9\sqrt{2}}{7}$$

$$a) \frac{31-25\sqrt{2}}{289}$$

$$b) \frac{(\sqrt{3}-\sqrt{2})^2 - (\sqrt{3}+\sqrt{2})^2}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})} = -4\sqrt{6}$$

$$c) 1 + \frac{\sqrt{2}}{1+\sqrt{2}} + 1 - \sqrt{2} = \frac{2\sqrt{2}}{1+\sqrt{2}} = 4 - 2\sqrt{2}$$

$$d) \sqrt{5}$$

$$e) (11\sqrt{2}-12)(\sqrt{3}-\sqrt{2}) = \\ = 11\sqrt{6} - 22 - 12\sqrt{3} + 12\sqrt{2}$$

$$f) \frac{[(\sqrt{2}+1)(\sqrt{2}-1)]^2}{\sqrt{2}} = \frac{1^2}{\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$g) -4$$

Pàgina 12

$$a) \frac{3(1-\sqrt{2})}{(1+\sqrt{2})(1-\sqrt{2})} = \frac{3-3\sqrt{2}}{1-2} = 3\sqrt{2}-3$$

$$b) \frac{\sqrt{3}(1-\sqrt{3})}{1-3} = \frac{\sqrt{3}-3}{-2} = \frac{3-\sqrt{3}}{2}$$

$$c) \frac{\sqrt{2}(\sqrt{5}+\sqrt{2})}{5-2} = \frac{\sqrt{10}+2}{3}$$

$$d) \frac{1+(\sqrt{2})^2}{1-2} = -(1+\sqrt{2})^2 = \\ = (1+2+2\sqrt{2}) = -3-2\sqrt{2}$$

$$e) \frac{2(\sqrt{4}+\sqrt{7})}{4-7} = \frac{-2\sqrt{4}-2\sqrt{7}}{3}$$

$$f) \frac{(\sqrt{2}+\sqrt{3})(1-\sqrt{2})}{1-2} = -\sqrt{2}+2-\sqrt{3}+\sqrt{6}$$

$$g) \frac{4\sqrt{2}(\sqrt{2}+1)}{3(2-1)} = \frac{8+4\sqrt{2}}{3}$$

$$h) \frac{5\sqrt{3}-2}{75-4} = \frac{5\sqrt{3}-2}{71}$$

$$i) \frac{(1-\sqrt{2})(3\sqrt{2}-1)}{18-1} = \frac{-7+4\sqrt{2}}{17}$$

$$j) \frac{3\sqrt{2}+2\sqrt{3}}{6}$$

Pàgina 13

$$a) 4$$

$$b) 1$$

$$c) 2$$

$$d) -1$$

$$e) -1$$

$$f) -2$$

$$g) \frac{5}{2}$$

$$h) \frac{5}{4}$$

$$i) \frac{1}{2}$$

$$j) 1$$

$$k) 2$$

$$l) -2$$

$$m) -3$$

$$n) \frac{-3}{2}$$

$$o) \frac{-1}{2}$$

$$p) 1$$

$$q) 3$$

$$r) 0$$

$$s) \frac{1}{2}$$

$$t) \frac{-1}{3}$$

- 2 a) 0,699 b) 0,301
 c) -0,602 d) 1,946
 e) -0,693 f) 0,805
 g) 8,708 h) 21,886
 i) -5,301

- 3 a) $x = 9$ b) $x = 2$
 c) $x = 4$ d) $x = 1000$
 e) $x = e$ f) $x = 1$
 g) $x = 3$
 h) $x + 1 = 100 \rightarrow x = 99$
 i) $2x = 10 \rightarrow x = 5$

Pàgina 15

- 4 a) 1,585 b) 5,129
 c) 0,732 d) 3,322
 e) 1,579 f) -1,199

- 5 a) $\frac{2}{5} \log_3 x = 0,64$
 b) $\log_3 9 + 2 \log_3 x = 2 + 2 \cdot 1,6 = 5,2$
 c) $\frac{-1}{2} \log_3 x = -0,8$

- 6 a) $2 \log A + \log B - 3 \log C = -8,6$
 b) $\frac{2}{3} \log A - \frac{2}{3} - \log B = -2,167$
 c) $\frac{\log A + \log B - \log C}{2} = -1,4$
 d) $-1 + 2 \log A + 3 \log B = -1,3$
 e) $\frac{2}{3} \log A + \frac{1}{3} \log B - 1 - \log C = -3,867$
 f) $\frac{5}{6} \log A + 3 \log B - \frac{1}{2} \log C = -0,05$

- 7 a) $\log_2 \frac{A^2}{B^3}$ b) $\ln \frac{AB^2}{C}$
 c) $\log \frac{\sqrt{A} C^2}{\sqrt[3]{B}}$ d) $\log \frac{\sqrt[4]{A^3}}{\sqrt[5]{B^2}}$
 e) $\ln \frac{\sqrt[3]{A^2}}{B \sqrt{C^3}}$

- 8 a) $x = \frac{25}{2}$ b) $x = 72$
 c) $x = 4$ d) $x = 27$
 e) $x = \frac{45}{4}$

Pàgina 16

- 1 a) $\frac{1}{4}, \frac{3}{5}, \frac{5}{6}$ b) 6, 18, 54
 c) $\frac{1}{3}, \frac{5}{12}, \frac{1}{2}$ d) $1, \frac{1}{10}, \frac{1}{100}$
 e) -2, 2, -2 f) $\frac{1}{2}, \frac{1}{2}, \frac{5}{8}$
 g) 0, 5, 8 h) 0, 2, 4
 i) $\frac{9}{2}, 3, \frac{81}{28}$

Pàgina 17

- 2 a) $\frac{6}{7}, \frac{7}{8}; a_n = \frac{n+1}{n+2}$
 b) 64, 128; $b_n = 2^n$
 c) 3, -3; $c_n = (-1)^n \cdot 3$
 d) 18, 21; $d_n = 3n$
- 3 a) $a_n = 2n + 1$ b) $b_n = \frac{n}{2}$
 c) $c_n = \frac{1}{2^n}$ d) $d_n = 10^{-n}$
 e) $e_n = \frac{n^2}{n+1}$ f) $f_n = (-3)^{n-1}$