MEMO 2026-11𝒜B-00007(2) Hersiening

(1) Vereenvoudig, sonder 'n sakrekenaar: (Skryf antwoorde as positiewe eksponente!)

(a)

$$36^{\frac{1}{2}} \times 8^{\frac{2}{3}} + 64^{\frac{-1}{6}} \times 7^0 = (6^2)^{\frac{1}{2}} \times (2^3)^{\frac{2}{3}} + (2^6)^{\frac{-1}{6}} \times 1$$

$$= 6 \times 2^2 + 2^{-1}$$

$$= 6 \times 4 + \frac{1}{2}$$

$$= 24\frac{1}{2}$$

(b)

$$\left(\frac{9x^2y^{-4}}{z^6}\right)^{\frac{1}{2}} \div \frac{(8x^3)^{\frac{2}{3}}}{4(z^{-1}y^{-1})^3} = \left(\frac{3^2x^2y^{-4}}{z^6}\right)^{\frac{1}{2}} \div \frac{(2^3x^3)^{\frac{2}{3}}}{4z^{-3}y^{-3}}$$

$$= \frac{3^1x^1y^{-2}}{z^3} \div \frac{2^2x^2}{4z^{-3}y^{-3}}$$

$$= \frac{3x^1y^{-2}}{z^3} \times \frac{4z^{-3}y^{-3}}{4x^2}$$

$$= \frac{3x^1\, z^{-3}\, y^{-2-3}}{z^3x^2}$$

$$= \frac{3x^1y^{-5}}{z^{3+3}x^2}$$

$$= \frac{3x^{1-2}y^{-5}}{z^6}$$

$$= \frac{3x^{-1}y^{-5}}{z^3}$$

$$= \frac{3}{z^6x^1y^5}$$

(c)

$$\left(2\frac{1}{4}\right)^{\frac{1}{2}} = \left(\frac{9}{4}\right)^{\frac{1}{2}}$$

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

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

(d) $$\frac{(0{,}25)^x \times 32^{x+1}}{24^x \times 3^{-x}} = \frac{\left(\frac{1}{4}\right)^x \times \left(2^5\right)^{x+1}}{\left(2^3 \,.\, 3^1\right)^x \times 3^{-x}}$$

$$= \frac{\left(2^{-2}\right)^x \times \left(2^5\right)^{x+1}}{\left(2^3 \,.\, 3^1\right)^x \times 3^{-x}}$$

$$= \frac{2^{-2x} \times 2^{5x+5}}{2^{3x} \,.\, 3^{1x} \times 3^{-x}}$$

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

$$= \frac{2^{3x+5-3x}}{3^0}$$

$$= \frac{2^5}{1} = 32$$

(e) $$\frac{3m \,.\, 3^{3x-1} + m \,.\, 27^x}{m^4 \,.\, 3^{4x} \,.\, (3^{-1})^x \,.\, m^{-3}} = \frac{3m \,.\, 3^{3x} \,.\, 3^{-1} + m \,.\, \left(3^3\right)^x}{m^{4-3} \,.\, 3^{4x} \,.\, 3^{-1x}}$$

$$= \frac{m \,.\, 3^{3x}\left(3^1 \,.\, 3^{-1} + 1\right)}{m^1 \,.\, 3^{4x-1x}}$$

$$= \frac{m \,.\, 3^{3x}\left(3^0 + 1\right)}{m^1 \,.\, 3^{3x}}$$

$$= 1 + 1 = 2$$

(f) $$\sqrt{128x^6} + \sqrt{98x^6} = \sqrt{64 \times 2x^6} + \sqrt{49 \times 2x^6}$$

$$= 8x^3\sqrt{2} + 7x^3\sqrt{2}$$

$$= 15x^3\sqrt{2}$$

(g) $$\frac{12^{n+1} \,.\, 27^{n-2}}{18^{2n-1}} = \frac{\left(2^2 \,.\, 3^1\right)^{n+1} \,.\, \left(3^3\right)^{n-2}}{\left(2^1 \,.\, 3^2\right)^{2n-1}}$$

$$= \frac{2^{2n+2} \,.\, 3^{n+1} \,.\, 3^{3n-6}}{2^{2n-1} \,.\, 3^{4n-2}}$$

$$= \frac{2^{2n+2} \,.\, 3^{n+1+3n-6}}{2^{2n-1} \,.\, 3^{4n-2}}$$

$$= 2^{2n+2-2n+1} \,.\, 3^{4n-5-4n+2}$$

$$= 2^3 \,.\, 3^{-3} = \frac{8}{27}$$

(h) $\left(7y^{\frac{1}{3}} - 3x^{\frac{2}{3}}\right)^2 = \left(7y^{\frac{1}{3}} - 3x^{\frac{2}{3}}\right)\left(7y^{\frac{1}{3}} - 3x^{\frac{2}{3}}\right)$

$$= 49y^{\frac{2}{3}} - 21x^{\frac{2}{3}}y^{\frac{1}{3}} - 21x^{\frac{2}{3}}y^{\frac{1}{3}} + 9x^{\frac{4}{3}}$$

$$= 49y^{\frac{2}{3}} - 42x^{\frac{2}{3}}y^{\frac{1}{3}} + 9x^{\frac{4}{3}}$$

(i) $\dfrac{m^{-2} - n^{-2}}{(mn)^{-2}} = \dfrac{\frac{1}{m^2} - \frac{1}{n^2}}{m^{-2} \,.\, n^{-2}}$

$$= \frac{\frac{n^2 - m^2}{m^2n^2}}{\frac{1}{m^2} \cdot \frac{1}{n^2}}$$

$$= \frac{n^2 - m^2}{m^2n^2} \div \frac{1}{m^2n^2}$$

$$= \frac{n^2 - m^2}{\cancel{m^2n^2}} \times \frac{\cancel{m^2n^2}}{1}$$

$$= n^2 - m^2$$

(2) As $\sqrt{2} = m$ en $\sqrt[3]{3} = n$, bewys dat:

$\sqrt{32} + \sqrt{18} + \sqrt[3]{6} \times \sqrt[3]{4} - \sqrt{72} = m + 2n$

$$\text{LK} = \sqrt{32} + \sqrt{18} + \sqrt[3]{6} \times \sqrt[3]{4} - \sqrt{72}$$

$$= \sqrt{16 \times 2} + \sqrt{9 \times 2} + \sqrt[3]{6 \times 4} - \sqrt{36 \times 2}$$

$$= 4\sqrt{2} + 3\sqrt{2} + \sqrt[3]{24} - 6\sqrt{2}$$

$$= 1\sqrt{2} + \sqrt[3]{8 \times 3}$$

$$= \sqrt{2} + \sqrt[3]{8} \times \sqrt[3]{3}$$

$$= \sqrt{2} + 2 \times \sqrt[3]{3}$$

$$= m + 2n = \text{RK}$$

(3) Rangskik $\sqrt{12}$; $\sqrt[3]{24}$ en $\sqrt[4]{48}$ in dalende volgorde, sonder om van 'n sakrekenaar gebruik te maak. Toon alle bewerkings.

$\sqrt{12} = \sqrt{4 \times 3} = 2\sqrt{3}$

$\sqrt[3]{24} = \sqrt[3]{8 \times 3} = 2\sqrt[3]{3}$

$\sqrt[4]{48} = \sqrt[4]{16 \times 3} = 2\sqrt[4]{3}$

$\therefore \sqrt{12} > \sqrt[3]{24} > \sqrt[4]{48}$ **want** $\sqrt{3} > \sqrt[3]{3} > \sqrt[4]{3}$

(4) Bewys dat: $4\,.\,5^{1-m} + \left(\sqrt{5}\right)^{-2m} = \frac{21}{5^m}$

$$\begin{aligned} \text{LK} &= 4\,.\,5^{1-m} + \left(\sqrt{5}\right)^{-2m} \\ &= 4\,.\,5^{1-m} + \left(5^{\frac{1}{2}}\right)^{-2m} \\ &= 4\,.\,5^{1}.5^{-m} + 5^{-m} \\ &= 5^{-m}(4 \times 5 + 1) \\ &= 5^{-m}(20 + 1) = 5^{-m}(21) \\ &= \frac{21}{5^m} = \text{RK} \end{aligned}$$