



## GRAAD 10\_KABV Kurrikulum

### 10.4 Eksponente

#### 1.1 Vereenvoudig m.b.v. eksponentwette.

(a)  $(3z^6)^2$

(b)  $2e^2m^4 \times 5e^3m^3$

(c)  $(-3x^3)^2 \times (-2x^3)^2$

(d)  $(5p^2)^0$

(e)  $\left(\frac{1}{3} q^8y^2\right)^4$

(f)  $-\left(-\frac{1}{4} a^3b^2\right)^3$

(g)  $\frac{7^3 m^{-3}}{7^{-1} m^6}$

(h)  $\left(\frac{2^3 e^{-3}}{y^3 p^{-3}}\right)^{-2}$

(i)  $36^{3x+4} \times 18^{4x}$

(j)  $25^{4b+5} \times 25^{3b}$

#### 1.2 Vereenvoudig die wortelvorme.

(a)  $\sqrt[4]{6} \times \sqrt[4]{4}$

(b)  $(\sqrt[5]{5})^{20}$

(c)  $(\sqrt{10} \times \sqrt{2})^4$

(d)  $(\sqrt[3]{9})^9$

#### 1.3 Los die eksponensiaal vergelykings op.

(a)  $25^x = 1$

(b)  $81^d = 27$

(c)  $2 \cdot 32^w = 4$

(d)  $5 \cdot 125^z - 3125 = 0$

(e)  $8^y \times 2^{y-1} = 1$

(f)  $49^{a-1} \times 7^{a+1} = 1$

(g)  $7^h - 7^{h-3} = 342$

(h)  $5^v + 5^{v-4} = 626$

(i)  $8x^{\frac{1}{3}} = 16$



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(j)  $y^{\frac{-3}{4}} = 125$

(k)  $z - 12z^{\frac{1}{2}} + 32 = 0$



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## MEMO

### 1.1 Vereenvoudig m.b.v. eksponentwette.

[4.3.1.3; 4.3.1.8; 4.3.2.1; 4.3.2.3; 4.3.3.1; 4.3.3.2]

(a)  $(3z^6)^2 = 9z^{12}$

(b)  $2e^2m^4 \times 5e^3m^3 = 10e^5m^7$

(c)  $(-3x^3)^2 \times (-2x^3)^2$   
 $= 9x^6 \times 4x^6$   
 $= 36x^{12}$

(d)  $(5p^2)^0 = 1$

(e)  $(\frac{1}{3} q^8y^2)^4 = \frac{1}{81} q^{32}y^8$

(f)  $-\left(-\frac{1}{4} a^3b^2\right)^3 - 6$   
 $= -\left(-\frac{1}{64} a^9b^6\right)$   
 $= \frac{1}{64} a^9b^6$

(g)  $\frac{7^3 m^{-3}}{7^{-1} m^6}$   
 $= 7^4 m^{-9}$   
 $= \frac{7^4}{m^9}$

(h)  $\left(\frac{2^3 e^{-3}}{y^3 p^{-3}}\right)^{-2}$   
 $= \frac{2^{-6} e^6}{y^{-6} p^6}$   
 $= \frac{e^6 y^6}{2^6 p^6}$



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$$\begin{aligned} \text{(i)} \quad & 36^{3x+4} \times 18^{4x} \\ &= (2^2 \cdot 3^2)^{3x+4} \times (2 \cdot 3^2)^{4x} \\ &= 2^{6x+8} \cdot 3^{6x+8} \times 2^{4x} \cdot 3^{8x} \\ &= 2^{10x+8} \cdot 3^{14x+8} \end{aligned}$$

$$\begin{aligned} \text{(j)} \quad & 25^{4b+5} \times 25^{3b} \\ &= (5^2)^{4b+5} \times (5^2)^{3b} \\ &= 5^{8b+10} \times 5^{6b} \\ &= 5^{14b+10} \end{aligned}$$

## 1.2 Vereenvoudig die wortelvorme. [4.3.5.6]

$$\text{(a)} \quad \sqrt[4]{6} \times \sqrt[4]{4} = \sqrt[4]{6 \times 4} = \sqrt[4]{24}$$

$$\text{(b)} \quad (\sqrt[5]{5})^{20} = (5^{\frac{1}{5}})^{20} = 5^4$$

$$\text{(c)} \quad (\sqrt{10} \times \sqrt{2})^4 = (\sqrt{10 \times 2})^4 = (20^{\frac{1}{2}})^4 = 20^2$$

$$\text{(d)} \quad (\sqrt[3]{9})^9 = (9^{\frac{1}{3}})^9 = 9^3$$

## 1.3 Los eksponensiaal vergelykings op. [4.9.1.1; 4.9.1.2; 4.9.1.3; 4.9.1.4; 4.9.2.1]

$$\begin{aligned} \text{(a)} \quad & 25^x = 1 \\ & (5^2)^x = 5^0 \\ & 5^{2x} = 5^0 \\ & 2x = 0 \\ & x = 0 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & 81^d = 27 \\ & (3^4)^d = 3^3 \\ & 3^{4d} = 3^3 \\ & 4d = 3 \\ & d = \frac{3}{4} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & 2 \cdot 32^w = 4 \\ & 2 \cdot 2^{5w} = 2^2 \\ & 2^{1+5w} = 2^2 \\ & 1 + 5w = 2 \\ & 5w = 1 \\ & w = \frac{1}{5} \end{aligned}$$



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$$\begin{aligned} \text{(d)} \quad 5 \cdot 125^z - 3125 &= 0 \\ 5 \cdot 125^z &= 3125 \\ 125^z &= 625 \\ 5^{3z} &= 5^4 \\ 3z &= 4 \\ z &= \frac{4}{3} \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad 8^y \times 2^{y-1} &= 1 \\ 2^{3y} \times 2^{y-1} &= 2^0 \\ 2^{4y-1} &= 2^0 \\ 4y - 1 &= 0 \\ 4y &= 1 \\ y &= \frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{(f)} \quad 49^{a-1} \times 7^{a+1} &= 1 \\ (7^2)^{a-1} \times 7^{a+1} &= 7^0 \\ 7^{2a-2} \times 7^{a+1} &= 7^0 \\ 7^{3a-1} &= 7^0 \\ 3a - 1 &= 0 \\ 3a &= 1 \\ a &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned} \text{(g)} \quad 7^h - 7^{h-3} &= 342 \\ 7^h - 7^h \cdot 7^{-3} &= 342 \\ 7^h(1 - 7^{-3}) &= 342 \\ 7^h\left(1 - \frac{1}{343}\right) &= 342 \\ 7^h \cdot \frac{342}{343} &= 342 \\ 7^h &= 343 \\ 7^h &= 7^3 \\ h &= 3 \end{aligned}$$

$$\begin{aligned} \text{(h)} \quad 5^v + 5^{v-4} &= 626 \\ 5^v + 5^v \cdot 5^{-4} &= 626 \\ 5^v(1 + 5^{-4}) &= 626 \\ 5^v\left(1 + \frac{1}{625}\right) &= 626 \end{aligned}$$



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$$5^v \left( \frac{626}{625} \right) = 626$$

$$5^v = 625$$

$$5^v = 5^4$$

$$v = 4$$

(i)

$$8x^{\frac{1}{3}} = 16$$

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

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

$$x = 8$$

(j)

$$y^{\frac{-3}{4}} = 125$$

$$\left(y^{\frac{-3}{4}}\right)^{\frac{-4}{3}} = (5^3)^{\frac{-4}{3}}$$

$$y = 5^{-4}$$

$$y = \frac{1}{625}$$

(k)

$$z - 12z^{\frac{1}{2}} + 32 = 0$$

$$\left(z^{\frac{1}{2}} - 8\right)\left(z^{\frac{1}{2}} - 4\right) = 0$$

$$z^{\frac{1}{2}} = 8; z^{\frac{1}{2}} = 4$$

$$z = 64; z = 16$$