Graad 9 – Boek B

(Onderwysers Handleiding)

(Hersiene KABV uitgawe)

INHOUD:

Hierdie boek is deur EJ Du Toit opgestel en verwerk in 2013.

Kontaknommer: 086 618 3709 (Faks!)

Hoofstuk B1

Algebraïese breuke

B1.1 Vereenvoudiging van breuke:

Onthou: *Eksponentwette
*Faktorisering – Hoofstuk A5

Vb .1 Vereenvoudig: (a) $\dfrac{24x^4 y^{\cdot} z}{-4xy^5 z} = \dfrac{+}{-} \times \dfrac{24}{4} \times \dfrac{x^4 y^2 \not{z}}{x^1 y^5 \not{z}} = \dfrac{-6x^3}{y^3}$

            (b) $\dfrac{4ab + 8a}{8a} = \dfrac{4a(b + 2)}{8a} = \dfrac{{}^1 4\not{a}(b + 2)}{{}^2 8\not{a}} = \dfrac{(b + 2)}{2}$

            (c) $\dfrac{m^2 + m - 12}{m^2 - 16} = \dfrac{(m + 4)(m - 3)}{(m + 4)(m - 4)} = \dfrac{(m - 3)}{(m - 4)}$

Oefening 1:   Datum: _____

Vereenvoudig: (Geen noemer is nul nie.)

(1) $\dfrac{{}^3 \cancel{30}m^2 n^5}{\cancel{10}mn^1}$

     $= 3m^1 n^4$

(2) $\dfrac{25xy^6}{-5xy^3}$

     $= -5y^3$

(3) $\dfrac{-12p^3 q^3 r}{12pq^2 r}$

     $= -1 p^2 q$

(4) $\dfrac{{}^3 \cancel{36}x^4 y^2}{{}_2 \cancel{24}x^2 y^4}$

     $= \dfrac{3 x^2}{2 y^2}$

(5) $\dfrac{-3a'b'c'}{{}_3 9a^2 b^3 c^4}$

     $= \dfrac{-1}{3ab^2 c^3}$

(6) $\dfrac{{}^1 7r^2 t^5}{{}_5 35t^3}$

     $= \dfrac{r^2 t^2}{5}$

(7) $\dfrac{m^6 n^7 p^3 q^4}{mn^3 p^9 q^8}$

     $= \dfrac{m^5 n^4}{p^6 q^4}$

(8) $\dfrac{-4mn^2 p^4}{-4mn^2 p^4}$

     $= 1$

(9) $\dfrac{3a^2 b' \times 2ab^2}{-6a^3 b^3}$

     $= \dfrac{6a^3 b^3}{-6a^3 b^3}$

     $= -1$

(10) $\dfrac{-20p^6 q^7}{-50p^3 q^3}$

     $= \dfrac{2p^3 q^4}{5}$

(11) $3a^2bc^6 \times -3ab^2c$

$$= \underline{-9a^3b^3c^7}$$

(12) $\dfrac{(m^2n)^4}{2m^5n^3}$

$$= \dfrac{m^8n^4}{2m^5n^3}$$

$$= \dfrac{m^3n}{2}$$

(13) $\dfrac{5xy \times 3xy}{6x^3y^2}$

$$= \dfrac{5x^2y}{2x^3y}$$

$$= \dfrac{5}{2x}$$

(14) $\dfrac{(-4ab^3)(-6a^2b)}{(-12a^2b^3)}$

$$= \dfrac{24a^3b^4}{-12a^2b^3}$$

$$= -2ab$$

(15) $\dfrac{p^2q^4 - 2pq}{4p^2q}$

$$= \dfrac{pq(pq^3 - 2)}{4p^2q}$$

$$= \dfrac{pq^3 - 2}{4p}$$

(16) $\dfrac{7a - 14b}{a - 2b}$

$$= \dfrac{7(a - 2b)}{(a - 2b)}$$

$$= 7$$

(17) $\dfrac{15x + 35}{5}$

$$= \dfrac{5(3x + 7)}{5}$$

$$= 3x + 7$$

(18) $\dfrac{m^2 + mn}{mn}$

$$= \dfrac{m(m + n)}{mn}$$

$$= \dfrac{m + n}{n}$$

(19) $\dfrac{16p^2q^2 - 32pq}{8pq^2}$

$$= \dfrac{16pq(pq - 2)}{8pq^2}$$

$$= \dfrac{2(pq - 2)}{q}$$

(20) $\dfrac{x^2 - 1}{x^2 + 2x + 1}$

$$= \dfrac{(x - 1)(x + 1)}{(x + 1)(x + 1)}$$

$$= \dfrac{x - 1}{x + 1}$$

(21) $\dfrac{3y^2 + 9y}{6y}$

$$= \dfrac{3y(y + 3)}{6y}$$

$$= \dfrac{y + 3}{2}$$

(22) $\dfrac{m^2 - 2m - 8}{m^2 - 4}$

$$= \dfrac{(m - 4)(m + 2)}{(m - 2)(m + 2)}$$

$$= \dfrac{m - 4}{m - 2}$$

(23) $\dfrac{5a^3b^2c}{-10abc \times 2abc}$

$$= \dfrac{5a^3b^2c}{-20a^2b^2c^2}$$

$$= \dfrac{a}{-4c}$$

(24) $\dfrac{3p^3 + p^2}{9p^2 - 1}$

$$= \dfrac{p^2(3p + 1)}{(3p + 1)(3p - 1)}$$

$$= \dfrac{p^2}{3p - 1}$$

(25) $$\dfrac{-2\left(x^2 y^5\right)^3}{6x^4 y}$$

$$= \dfrac{-\overset{1}{\cancel{2}}\, x^6 y^{15}}{\underset{3}{\cancel{6}}\, x^4 y^1}$$

$$= \dfrac{-x^2 y^{14}}{3}$$

(26) $$\dfrac{b^2 - b - 2}{b^2 + b - 6}$$

$$= \dfrac{(\cancel{b-2})(b+1)}{(b+3)(\cancel{b-2})}$$

$$= \dfrac{b+1}{b+3}$$

(27) $$\dfrac{5q^2 - 15q}{3q - 9}$$

$$= \dfrac{5q\,(\cancel{q-3})}{3\,(\cancel{q-3})}$$

$$= \dfrac{5q}{3}$$

(28) $$\dfrac{y^2 - 16}{y^2 + 7y + 12}$$

$$= \dfrac{(y-4)(\cancel{y+4})}{(\cancel{y+4})(y+3)}$$

$$= \dfrac{y-4}{y+3}$$

(29) $$\dfrac{p(p-2) + 5(p-2)}{p^2 - 2p}$$

$$= \dfrac{(\cancel{p-2})(p+5)}{p(\cancel{p-2})}$$

$$= \dfrac{p+5}{p}$$

(30) $$\dfrac{5x^3 - 20x}{10x^2 - 10x - 60}$$

$$= \dfrac{5x\,(x^2-4)}{10\,(x^2 - x - 6)}$$

$$= \dfrac{x(x-2)(\cancel{x+2})}{(x-3)(\cancel{x+2})} = \dfrac{x(x-2)}{(x-3)}$$

☺ 'n Klas bestaande uit (mn - 1) leerders het in totaal ($2m^2n^2$ - 2) vir 'n wiskundetoets behaal. Druk die klasgemiddeld in terme van m en n uit.

$$\text{Gem.} = \dfrac{2m^2n^2 - 2}{mn - 1}$$

$$= \dfrac{2(m^2n^2 - 1)}{(mn - 1)}$$

$$= \dfrac{2(\cancel{mn-1})(mn+1)}{(\cancel{mn-1})} = 2(mn+1)$$

B1.2 Vermenigvuldiging en deling:

Vb. 2 Vereenvoudig:

(a) $$\dfrac{6ab^2}{5ac} \times 3b^3c^2 \div \dfrac{18a^2bc}{10a} = \dfrac{6ab^2}{5ac} \times \dfrac{3b^3c^2}{1} \times \dfrac{10a}{18a^2bc} = \dfrac{180a^2b^5c^2}{90a^3b^1c^2} = \dfrac{2b^4}{a}$$

(b) $$\dfrac{y^2}{y^2 + 2y} \div \dfrac{y^2 + y - 6}{y^2 - 4} = \dfrac{y^2}{y^2 + 2y} \times \dfrac{y^2 - 4}{y^2 + y - 6} = \dfrac{y^2}{y(y+2)} \times \dfrac{(y-2)(y+2)}{(y+3)(y-2)} = \dfrac{y}{(y+3)}$$

Oefening 2:   Datum: _____

Vereenvoudig (geen noemer is nul nie):

(1) $$\dfrac{\overset{1}{3m^4n^3}}{4\,\cancel{16mn}} \times \dfrac{\overset{3}{\cancel{12}m^2n^2}}{\underset{3}{9mn}}$$

$$= \dfrac{\overset{1}{3}m^6n^5}{\underset{4}{\cancel{12}}m^2n^2}$$

$$= \dfrac{m^4n^3}{4}$$

(2) $$\dfrac{\overset{1}{\cancel{3}}}{5} \times \dfrac{a^3b^2c}{\underset{1}{\cancel{15}\cancel{b}}} \times \dfrac{\overset{2}{\cancel{10}}}{abc^4}$$

$$= \dfrac{2a^3b^2c}{5abc^4}$$

$$= \dfrac{2a^2b}{5c^3}$$

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(3) $\dfrac{x^7y^3}{xy^2} \div \dfrac{x^2y^3}{x^3y}$

$= \dfrac{x^7y^3}{x^1y^2} \times \dfrac{x^3y^1}{x^2y^3}$

$= \dfrac{x^6y}{1} \times \dfrac{x}{y^2}$

$= \dfrac{x^7}{y}$

(4) $\dfrac{6q^2}{4p^2} \times \dfrac{2yq}{10y} \div \dfrac{3q^3}{5p^3q}$

$= \dfrac{6q^2}{2p^2} \times \dfrac{q}{8} \times \dfrac{5p^3q}{3q^3}$

$= \dfrac{p^3q^4}{2p^2q^3}$

$= \dfrac{pq}{2}$

(5) $\dfrac{ab^3}{b^2c} \div \dfrac{ab^2}{a^3c} \times \dfrac{a^2b^2c^2}{c}$

$= \dfrac{ab}{c} \times \dfrac{a^3c}{ab^2} \times \dfrac{a^2b^2c}{1}$

$= a^5bc$

(6) $\dfrac{4rt^4}{12r^2t^2} \div \left(\dfrac{6r^5t^4}{3r^3} \times \dfrac{10rt}{5t^2} \right)$

$= \dfrac{t^2}{3r} \div \left(\dfrac{4r^6t^5}{r^3t^2} \right)$

$= \dfrac{t^2}{3r} \div \dfrac{4r^3t^3}{1}$

$= \dfrac{t^2}{3r} \times \dfrac{1}{4r^3t^3} = \dfrac{1}{12r^4t}$

(7) $\left(\dfrac{3m^2}{8n^3} \div \dfrac{6mn}{9m^2n^2} \right) \times \dfrac{12m^2}{9n^3}$

$= \left(\dfrac{3m^2}{8n^3} \times \dfrac{9m^2n^2}{6mn} \right) \times \dfrac{4m^2}{3n^3}$

$= \dfrac{3 \cdot 9m^4n^2}{48m^1n^4} \times \dfrac{4m^2}{8n^3}$

$= \dfrac{3m^6n^2}{4m^1n^7} = \dfrac{3m^5}{4n^5}$

(8) $\dfrac{4(ab)^2}{15a} \div \dfrac{8ab^2}{5b} \div \dfrac{10a^2b^3}{4}$

$= \dfrac{4a^2b^2}{15a} \times \dfrac{5b}{8ab^2} \times \dfrac{4}{10a^2b^3}$

$= \dfrac{2a^2b^3}{30a^4b^5}$

$= \dfrac{1}{15a^2b^2}$

(9) $\dfrac{y}{y^2+3y} \div \dfrac{y^2}{y^2-3y}$

$= \dfrac{y}{y(y+3)} \div \dfrac{y^2}{y(y-3)}$

$= \dfrac{1}{(y+3)} \times \dfrac{y(y-3)}{y^2}$

$= \dfrac{y-3}{y(y+3)}$

(10) $\dfrac{mn^2-m^2n}{m^2-n^2} \times \dfrac{m+n}{m^3n^2}$

$= \dfrac{mn(n-m)}{(m-n)(m+n)} \times \dfrac{(m+n)}{m^3n^2}$

$= \dfrac{-mn(m-n)}{m^3n^2(m-n)}$

$= \dfrac{-1}{m^2n}$

(11) $\dfrac{x^2+3x}{x^2-2x-8} \times \dfrac{x^2-16}{x^2-9}$

$= \dfrac{x(x+3)}{(x-4)(x+2)} \times \dfrac{(x-4)(x+4)}{(x-3)(x+3)}$

$= \dfrac{x(x+4)}{(x+2)(x-3)}$

(12) $\dfrac{y^2+2y}{y^3+y^2} \div \dfrac{y^2-4}{y^2-y-2}$

$= \dfrac{y(y+2)}{y^2(y+1)} \div \dfrac{(y-2)(y+2)}{(y-2)(y+1)}$

$= \dfrac{(y+2)}{y(y+1)} \times \dfrac{(y+1)}{(y+2)}$

$= \dfrac{1}{y}$

(13) $\dfrac{p(p-5)+2(p-5)}{p^2-25} \times \dfrac{p-2}{p^2-4}$

$= \dfrac{(p-5)(p+2)}{(p-5)(p+5)} \times \dfrac{(p-2)}{(p-2)(p+2)}$

$= \dfrac{1}{p+5}$

(14) $\dfrac{a^2+a}{a^2+2a+1} \times \dfrac{(a+1)^2}{a^2-1}$

$= \dfrac{a(a+1)}{(a+1)(a+1)} \times \dfrac{(a+1)(a+1)}{(a+1)(a-1)}$

$= \dfrac{a}{a-1}$

(15) $\dfrac{\overset{8}{+16}m^3n}{+2mn^2} \div \dfrac{10m^2n^2}{15m^4n^3} \div \dfrac{6m^2}{-n^2}$

$= \dfrac{\overset{4}{8}m^2}{n} \times \dfrac{\overset{3}{15}m^4n^3}{\underset{2}{10}m^2n^2} \times \dfrac{-n^2}{6m^2}$

$= \dfrac{-12m^4n^5}{6m^2n^3}$

$= -2m^2n^2$

(16) $\dfrac{abc+ab}{bc} \times \dfrac{b^2c^2}{c^2-1}$

$= \dfrac{ab(c+1)}{bc} \times \dfrac{b^2c^2}{(c-1)(c+1)}$

$= \dfrac{ab^2c^2}{c(c-1)}$

$= \dfrac{ab^2c}{(c-1)}$

(17) $\dfrac{p^2-p-20}{4p+p^2} \div \dfrac{p^2-25}{p^2+6p+5}$

$= \dfrac{(p-5)(p+4)}{p(4+p)} \div \dfrac{(p-5)(p+5)}{(p+5)(p+1)}$

$= \dfrac{(p-5)(p+4)}{p(4+p)} \times \dfrac{(p+5)(p+1)}{(p-5)(p+5)}$

$= \dfrac{p+1}{p}$

(18) $\dfrac{xy-x^2+my-mx}{x^2-y^2} \times \dfrac{nx-mn}{x^2-m^2}$

$= \dfrac{x(y-x)+m(y-x)}{(x-y)(x+y)} \times \dfrac{n(x-m)}{(x-m)(x+m)}$

$= \dfrac{(y-x)(x+m)}{-(y-x)(x+y)} \times \dfrac{n}{(x+m)}$

$= \dfrac{-n}{(x+y)}$

(19) $\left(\dfrac{c+2}{c-2} \div \dfrac{c+2}{c-1}\right) \times \dfrac{c^2-4}{(c-1)(c+3)}$

$= \left(\dfrac{(c+2)}{(c-2)} \times \dfrac{(c-1)}{(c+2)}\right) \times \dfrac{(c-2)(c+2)}{(c-1)(c+3)}$

$= \dfrac{(c-1)}{(c-2)} \times \dfrac{(c-2)(c+2)}{(c-1)(c+3)}$

$= \dfrac{c+2}{c+3}$

(20) $\left(\dfrac{y^2-6y-7}{y^2-7y}\right)\left(\dfrac{y^2-y}{y^2-1}\right)$

$= \left(\dfrac{(y-7)(y+1)}{y(y-7)}\right)\left(\dfrac{y(y-1)}{(y-1)(y+1)}\right)$

$= \dfrac{y(y+1)}{y(y+1)}$

$= 1$

☺ **Vereenvoudig:**

$$\frac{\dfrac{4x^2 - 1}{x^2 - 3x - 4}}{\dfrac{2x^2 + x}{x^2 - 4x}}$$

$$= \frac{(2x-1)(2x+1)}{(x-4)(x+1)} \div \frac{x(2x+1)}{x(x-4)}$$

$$= \frac{(2x-1)\cancel{(2x+1)}}{\cancel{(x-4)}(x+1)} \times \frac{\cancel{(x-4)}}{\cancel{(2x+1)}}$$

$$= \frac{(2x-1)}{(x+1)}$$

B1.3 Optel en aftrek:

Vb. 3 Vereenvoudig: (a) $\dfrac{2x}{5} + \dfrac{3x}{5} = \dfrac{2x + 3x}{5} = \dfrac{5x}{5} = \underline{x}$

(b) $\dfrac{3y}{2} - \dfrac{y}{3} = \dfrac{3y}{2} \times \dfrac{3}{3} - \dfrac{y}{3} \times \dfrac{2}{2} = \dfrac{9y}{6} - \dfrac{2y}{6} = \dfrac{9y - 2y}{6} = \underline{\dfrac{7y}{6}}$

(c) $\dfrac{2}{5xy} + \dfrac{3}{10x^2} - \dfrac{1}{y^2}$ $\qquad KGV = 10x^2 y^2$

$$= \frac{2}{5xy} \times \frac{2xy}{2xy} + \frac{3}{10x^2} \times \frac{y^2}{y^2} - \frac{1}{y^2} \times \frac{10x^2}{10x^2}$$

$$= \frac{4xy}{10x^2 y^2} + \frac{3y^2}{10x^2 y^2} - \frac{10x^2}{10x^2 y^2}$$

$$= \frac{4xy + 3y^2 - 10x^2}{10x^2 y^2}$$

Oefening 3: $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ Datum: _____

Vereenvoudig (geen noemer is nul nie):

(1) $\dfrac{3}{4} + \dfrac{1}{3}$ $\qquad KGV = 12$

$= \dfrac{9}{12} + \dfrac{4}{12}$

$= \dfrac{13}{12}$

$= 1\dfrac{1}{12}$

(2) $\dfrac{5}{7} - \dfrac{1}{2}$ $\qquad KGV = 14$

$= \dfrac{10}{14} - \dfrac{7}{14}$

$= \dfrac{3}{14}$

(3) $\dfrac{4}{ab} + \dfrac{3}{b}$ $\qquad KGV = ab$

$= \dfrac{4}{ab} + \dfrac{3a}{ab}$

$= \dfrac{4 + 3a}{ab}$

(4) $1\dfrac{3}{4} - 2$ $\qquad KGV = 4$

$= \dfrac{7}{4} - \dfrac{2}{1}$

$= \dfrac{7}{4} - \dfrac{8}{4}$

$= \dfrac{-1}{4}$

(5) $\dfrac{2}{x} - \dfrac{3x}{y}$ $KGV = xy$

$= \dfrac{2y}{xy} - \dfrac{3x^2}{xy}$

$= \dfrac{2y - 3x^2}{xy}$

(6) $\dfrac{2a}{3} - \dfrac{a}{2} - \dfrac{3a}{4}$ $KGV = 12$

$= \dfrac{8a}{12} - \dfrac{6a}{12} - \dfrac{9a}{12}$

$= \dfrac{8a - 6a - 9a}{12}$

$= \dfrac{-7a}{12}$

(7) $\dfrac{2p}{15} + \dfrac{3p}{10}$ $KGV = 30$

$= \dfrac{4p}{30} + \dfrac{9p}{30}$

$= \dfrac{13p}{30}$

(8) $\dfrac{4}{y} - \dfrac{2}{3y} + \dfrac{1}{2y}$ $KGV = 6y$

$= \dfrac{24}{6y} - \dfrac{4}{6y} + \dfrac{3}{6y}$

$= \dfrac{23}{6y}$

(9) $\dfrac{-2}{b^2} + \dfrac{2}{b} + 1$ $KGV = b^2$

$= \dfrac{-2}{b^2} + \dfrac{2b}{b^2} + \dfrac{b^2}{b^2}$

$= \dfrac{-2 + 2b + b^2}{b^2}$

(10) $\dfrac{y-1}{y} + \dfrac{y+2}{3}$ $KGV = 3y$

$= \dfrac{3(y-1)}{3y} + \dfrac{y(y+2)}{3y}$

$= \dfrac{3(y-1) + y(y+2)}{3y}$

$= \dfrac{3y - 3 + y^2 + 2y}{3y}$

$= \dfrac{y^2 + 5y - 3}{3y}$

(11) $\dfrac{3m}{n^2} + \dfrac{m}{2n}$ $KGV = 2n^2$

$= \dfrac{6m}{2n^2} + \dfrac{mn}{2n^2}$

$= \dfrac{6m + mn}{2n^2}$

(12) $\dfrac{4}{pq} - \dfrac{2}{p} - 1$ $KGV = pq$

$= \dfrac{4}{pq} - \dfrac{2q}{pq} - \dfrac{pq}{pq}$

$= \dfrac{4 - 2q - pq}{pq}$

(13) $\dfrac{x^2 - x}{3} - \dfrac{x^2 + 3}{6} + \dfrac{x-1}{9}$ $KGV = 18$

$= \dfrac{6(x^2-x)}{18} - \dfrac{3(x^2+3)}{18} + \dfrac{2(x-1)}{18}$

$= \dfrac{6(x^2-x) - 3(x^2+3) + 2(x-1)}{18}$

$= \dfrac{6x^2 - 6x - 3x^2 - 9 + 2x - 2}{18}$

$= \dfrac{3x^2 - 4x - 11}{18}$

(14) $\dfrac{3n - 12}{2m} + \dfrac{n^2 - 4}{4m} + \dfrac{5n}{6m}$ $KGV = 12m$

$= \dfrac{6(3n-12)}{12m} + \dfrac{3(n^2-4)}{12m} + \dfrac{2 \times 5n}{12m}$

$= \dfrac{6(3n-12) + 3(n^2-4) + 10n}{12m}$

$= \dfrac{18n - 72 + 3n^2 - 12 + 10n}{12m}$

$= \dfrac{3n^2 + 28n - 84}{12m}$

(15) $\dfrac{4y-1}{y^2} + \dfrac{2y-1}{y} + \dfrac{1}{2}$ $KGV = 2y^2$

$= \dfrac{2(4y-1)}{2y^2} + \dfrac{2y(2y-1)}{2y^2} + \dfrac{y^2}{2y^2}$

$= \dfrac{8y-2 + 4y^2-2y + y^2}{2y^2}$

$= \dfrac{5y^2+6y-2}{2y^2}$

(16) $\dfrac{3}{5x^2y^2} - \dfrac{1}{x^2y} + \dfrac{2}{y}$ $KGV = 5x^2y^2$

$= \dfrac{3}{5x^2y^2} - \dfrac{5y}{5x^2y^2} + \dfrac{2\times 5x^2y}{5x^2y^2}$

$= \dfrac{3 - 5y + 10x^2y}{5x^2y^2}$

(17) $\dfrac{q^2+q-2}{2pq} + \dfrac{3q-1}{4p}$ $KGV = 4pq$

$= \dfrac{2(q^2+q-2)}{4pq} + \dfrac{q(3q-1)}{4pq}$

$= \dfrac{2(q^2+q-2)+q(3q-1)}{4pq}$

$= \dfrac{2q^2+2q-4+3q^2-q}{4pq}$

$= \dfrac{5q^2+q-4}{4pq}$

(18) $\dfrac{3x-4}{x^2} - \dfrac{2x-3}{3x} - 1\tfrac{1}{2} \searrow \tfrac{3}{2}$ $KGV = 6x^2$

$= \dfrac{6(3x-4)}{6x^2} - \dfrac{2x(2x-3)}{6x^2} - \dfrac{3x(3x^2)}{6x^2}$

$= \dfrac{6(3x-4) - 2x(2x-3) - 9x^2}{6x^2}$

$= \dfrac{18x-24 - 4x^2 + 6x - 9x^2}{6x^2}$

$= \dfrac{-13x^2+24x-24}{6x^2}$

(19) $\dfrac{2(a+3)}{3a} + \dfrac{4a-1}{5a}$ $KGV = 15a$

$= \dfrac{5\times 2(a+3)}{15a} + \dfrac{3(4a-1)}{15a}$

$= \dfrac{10(a+3) + 3(4a-1)}{15a}$

$= \dfrac{10a+30 + 12a-3}{15a}$

$= \dfrac{22a+27}{15a}$

(20) $\dfrac{1-y}{6y} + \dfrac{3-2y}{2y^2} - \dfrac{y^2+y+4}{3y^2}$ $KGV = 6y^2$

$= \dfrac{y(1-y)}{6y^2} + \dfrac{3(3-2y)}{6y^2} - \dfrac{2(y^2+y+4)}{6y^2}$

$= \dfrac{y(1-y) + 3(3-2y) - 2(y^2+y+4)}{6y^2}$

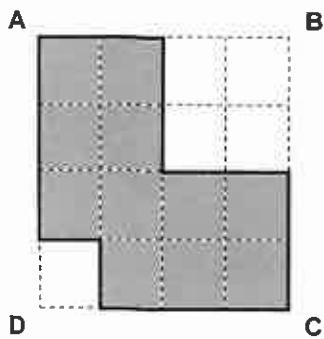$= \dfrac{y-y^2 + 9-6y - 2y^2-2y-8}{6y^2}$

$= \dfrac{-3y^2-7y+1}{6y^2}$

☺ **ABCD is 'n vierkant bestaande uit kleiner vierkante. Die sylengtes van die groot vierkant is elk gelyk aan $(2x - y)$. Bepaal 'n uitdrukking vir die oppervlakte van die ingekleurde gebied in terme van x en y.**

$Opp^k = (2x-y)^2 - \left(\dfrac{2x-y}{2}\right)^2 - \left(\dfrac{2x-y}{4}\right)^2$

$= \dfrac{(2x-y)^2}{1} - \dfrac{(2x-y)^2}{4} - \dfrac{(2x-y)^2}{16}$

$= \dfrac{16(2x-y)^2 - 4(2x-y)^2 - 1(2x-y)^2}{16}$

$= \dfrac{11(2x-y)^2}{16}$

B1.4 HERSIENINGSOEFENING:

Vereenvoudig (geen noemer is nul nie):

(1) $\dfrac{-\overset{1}{2}a^2b^2c}{-\underset{2}{4}abc^3}$

$= \dfrac{ab}{2c^2}$

(2) $\dfrac{2}{3a} + \dfrac{-1}{4a}$ KGV = 12a

$= \dfrac{8}{12a} + \dfrac{-3}{12a}$

$= \dfrac{5}{12a}$

(3) $\dfrac{\left(2x^2y\right)^2}{4x^4y^2}$

$= \dfrac{4x^4y^2}{4x^4y^2}$

$= 1$

(4) $\dfrac{3x - 6y}{6}$

$= \dfrac{3(x-2y)}{\overset{}{6}\,2}$

$= \dfrac{x-2y}{2}$

(5) $\dfrac{1}{p^2} + \dfrac{3}{p} - 1$ KGV = p^2

$= \dfrac{1}{p^2} + \dfrac{3p}{p^2} - \dfrac{p^2}{p^2}$

$= \dfrac{1 + 3p - p^2}{p^2}$

(6) $\dfrac{m^2 - 1}{mn + n}$

$= \dfrac{(m-1)(m+1)}{n(m+1)}$

$= \dfrac{m-1}{n}$

(7) $\dfrac{\left(5p^2q^3\right)\left(-2pq^2\right)}{\left(4pq\right)^2}$

$= \dfrac{-10p^3q^5}{4^2p^2q^2}$

$= \dfrac{-10p^3q^5}{16p^2q^2}$

$= \dfrac{-5pq^3}{8}$

(8) $\dfrac{4}{3}\curvearrowleft$ $1\dfrac{1}{3} - \dfrac{3a}{4} - \dfrac{4a}{5}$ KGV = 60

$= \dfrac{4\times20}{60} - \dfrac{3a\times15}{60} - \dfrac{4a\times12}{60}$

$= \dfrac{80 - 45a - 48a}{60}$

$= \dfrac{80 - 93a}{60}$

(9) $\dfrac{x^2 - x - 12}{x^2 - 9}$

$= \dfrac{(x-4)(x+3)}{(x-3)(x+3)}$

$= \dfrac{x-4}{x-3}$

(10) $\dfrac{x^2y - xy}{x^2 - 2x + 1} \times \dfrac{x^2 - 1}{x^2 + x}$

$= \dfrac{xy(x-1)}{(x-1)(x-1)} \times \dfrac{(x-1)(x+1)}{x(x+1)}$

$= \dfrac{xy}{x}$

$= y$