

**Graad 9 – Boek B**  
(Hersiene KABV uitgawe)

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## Hoofstuk B1

### Algebraïese breuke

#### B1.1 Vereenvoudiging van breuke:

**Onthou: \*EkspONENTWETTE**

**\*FAKTORISERING – Hoofstuk A5**

Vb .1 Vereenvoudig:

$$(a) \quad \frac{24x^4y^2z}{-4xy^5z} = \frac{+}{-} \times \frac{24}{4} \times \frac{x^4y^2\cancel{z}}{x^1y^5\cancel{z}} = \frac{-6x^3}{y^3}$$

$$(b) \quad \frac{4ab + 8a}{8a} = \frac{4a(b + 2)}{8a} = \frac{1\cancel{4}a(b + 2)}{2\cancel{8}a} = \frac{(b + 2)}{2}$$

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

Oefening 1:

Datum: \_\_\_\_\_

Vereenvoudig: (Geen noemer is nul nie.)

(1)  $\frac{30m^2n^5}{10mn}$

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

---

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

---

(4)  $\frac{36x^4y^2}{24x^2y^4}$

---

(5)  $\frac{-3abc}{9a^2b^3c^4}$

---

(6)  $\frac{7r^2t^5}{35t^3}$

---

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

---

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

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

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

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

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

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

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

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(19)  $\frac{16p^3q^2 - 32pq}{8pq^2}$

---



---

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

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

---



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

---



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

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---

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

---



---

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

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---

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

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

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

---



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$$(25) \quad \frac{-2(x^2y^5)^3}{6x^4y}$$

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

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

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

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

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

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☺ '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.

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## B1.2 Vermenigvuldiging en deling:

Vb. 2 Vereenvoudig:

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

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

Oefening 2:

Datum: \_\_\_\_\_

Vereenvoudig (geen noemer is nul nie):

$$(1) \quad \frac{3m^4n^3}{16mn} \times \frac{12m^2n^2}{9mn}$$

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$$(2) \quad \frac{3}{5} \times \frac{a^3b^2c}{15} \times \frac{10}{abc^4}$$

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


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$$(4) \quad \frac{6q^2}{4p^2} \times \frac{2pq}{10p} \div \frac{3q^3}{5p^3 q}$$


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


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


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


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


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


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


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


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


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

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

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$$(15) \quad \frac{-16m^3n}{-2mn^2} \div \frac{10m^2n^2}{15m^4n^3} \div \frac{6m^2}{-n^2}$$

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

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

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

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

---



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

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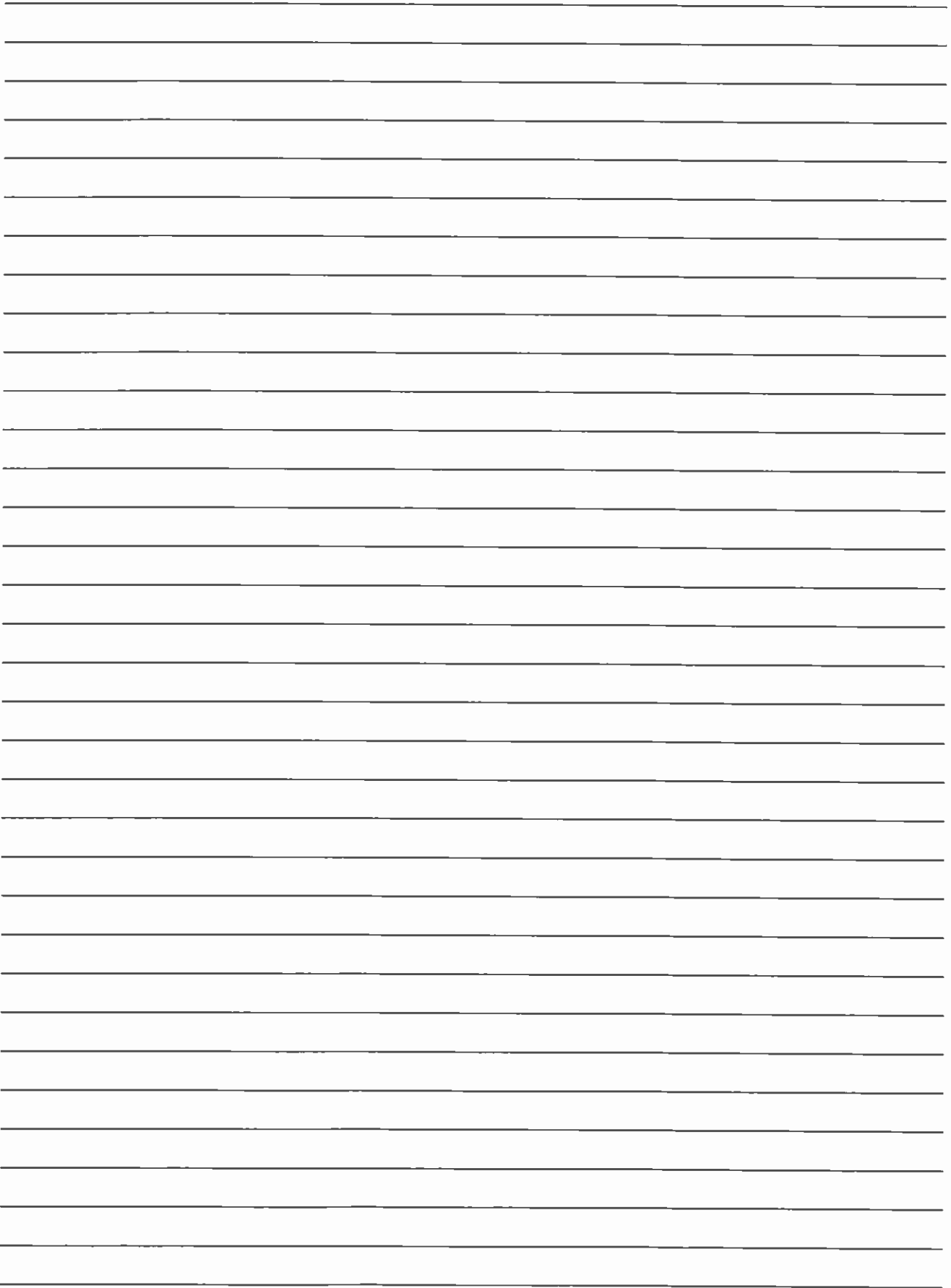
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☺ Vereenvoudig:  $\frac{4x^2 - 1}{x^2 - 3x - 4} = \frac{2x^2 + x}{x^2 - 4x}$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**B1.3 Optel en aftrek:**

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

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

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

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

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

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

Oefening 3:

Datum: \_\_\_\_\_

Vereenvoudig (geen noemer is nul nie):

(1)  $\frac{3}{4} + \frac{1}{3}$

(2)  $\frac{5}{7} - \frac{1}{2}$

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\_\_\_\_\_

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(3)  $\frac{4}{ab} + \frac{3}{b}$

(4)  $1\frac{3}{4} - 2$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



(5)  $\frac{2}{x} - \frac{3x}{y}$

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(6)  $\frac{2a}{3} - \frac{a}{2} - \frac{3a}{4}$

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(7)  $\frac{2p}{15} + \frac{3p}{10}$

---

---

(8)  $\frac{4}{y} - \frac{2}{3y} + \frac{1}{2y}$

---

---

(9)  $\frac{-2}{b^2} + \frac{2}{b} + 1$

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(10)  $\frac{y-1}{y} + \frac{y+2}{3}$

---

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---

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(11)  $\frac{3m}{n^2} + \frac{m}{2n}$

---

---

---

(12)  $\frac{4}{pq} - \frac{2}{p} - 1$

---

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---

(13)  $\frac{x^2 - x}{3} - \frac{x^2 + 3}{6} + \frac{x - 1}{9}$

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

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$$(15) \quad \frac{4y - 1}{y^2} + \frac{2y - 1}{y} + \frac{1}{2}$$

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$$(16) \quad \frac{3}{5x^2y^2} - \frac{1}{x^2y} + \frac{2}{y}$$

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$$(17) \quad \frac{q^2 + q - 2}{2pq} + \frac{3q - 1}{4p}$$

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$$(18) \quad \frac{3x - 4}{x^2} - \frac{2x - 3}{3x} - 1\frac{1}{2}$$

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$$(19) \quad \frac{2(a + 3)}{3a} + \frac{4a - 1}{5a}$$

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$$(20) \quad \frac{1 - y}{6y} + \frac{3 - 2y}{2y^2} - \frac{y^2 + y + 4}{3y^2}$$

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☺ 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  $y$ .

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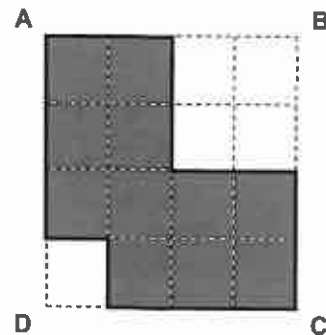
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**B1.4 HERSIENINGSOEFENING:**

Datum: \_\_\_\_\_

Vereenvoudig (geen noemer is nul nie):

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

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(3) 
$$\frac{(2x^2y)^2}{4x^4y^2}$$

---



---

(5) 
$$\frac{1}{p^2} + \frac{3}{p} - 1$$

---



---

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

---



---

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

---



---



---



---

(2) 
$$\frac{2}{3a} + \frac{-1}{4a}$$

---



---

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

---



---

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

---



---

(8) 
$$1\frac{1}{3} - \frac{3a}{4} - \frac{4a}{5}$$

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

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