

Gr 8 Wiskunde | Mathematics

Algebra (1)

1. Optel en Aftrek / Adding and Subtracting

- Jy kan slegs dieselfde "soorte" by mekaar +/-

You can only +/ - the same "types".
- Jy HOEF nie net 1 antwoord te kry nie (1 term)

You DO NOT have to end with ONLY 1 term answers.

a) $(2a + b) + (a + 2b)$
 $= 3a + 3b$
 DONE!

1. Highlighter kleure - selfde
 Highlighter | colours - same.

2. Teken VOOR gaan saam
 Sign in FRONT goes with.

3. $a = 1a$

$b = 1b$ ens | etc

Pasop vir minus-getalle
 Watch out for negative nrs
 $-2 - 4 = -6$

b) $(3x - 2y) + (2x - 4y)$
 $= 5x - 6y$
 DONE!

c) $(3a + b - 2) + (2a - 3b + 6)$
 $= 5a - 2b + 4$
 DONE!

Oef / Ex

- $10a + 2b + 3c - 2a + 3b$
- $4 + 6x - 2 - 3x$
- $x + y + 2x - 2y$
- $4m + n - m + 2n$
- $3a + 2a + a$
- $3x + 2 - y + 4 - x$

1. $8a + 5b + 3c$	Memo
2. $2 + 3x$ / $3x + 2$	
3. $3x - y$ / $3x - ly$	
4. $3m + 3n$	
5. $6a$	
6. $2x - y + 6$	

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Algebra (2)

2. Optel en Aftrek (2) / Adding & Subtracting (2)

!! Wat van terme met verskillende eksponente?
What about terms with different exponents?

a) $(2x^2) + (3x) + (x^2) + 3$
 $= 3x^2 + 3x + 3$
 DONE!

x^2 Stel basies
 area voor...
 represents area
 of a shape...
 x Stel omtrek
 voor van voorwerp
 represents peri-
 meter of shape...

NOT THE SAME!

b) $(3a^2) + (2a) - (4a) + (a^2)$
 $= 4a^2 - 2a$

- meer "balkies" / eksponente
 • more "badges" / exponents

c) $(2) + (2x^2) + (x^3) + (x^2)$
 $= x^3 + 3x^2 + 2$

- skryf antw in dalende eksponente
 • write answ in descending exponents

d) $(4x^3) + (2y) - (3) + (4y) - (x)$
 $= 4x^3 + 6y - x - 3$
 DONE!

e) $(3y^3) + (2y^2) - (y^3) + (y^2) - (y)$
 $= 2y^3 + 3y^2 - y$
 DONE!

Def | Ex

- | | |
|-----------------------------|----------------------------|
| 1. $3a^2 + 2a - 4 - 2a^2$ | 6. $3x^2 - 2x - x^2 + 2x$ |
| 2. $x^2 + x^2 + x^2$ | 7. $b^2 + b^3 + b^2 + b^3$ |
| 3. $2 - y^2 + 3y + 4y^2$ | 8. $4a^2b + 2a^2b$ |
| 4. $6x^3 - 4x^2 - 2x^3 - 4$ | 9. $6a - 2a^2 + 4a + 4a^2$ |
| 5. $a^2 + a^3 + a - a$ | 10. $10a^2 - 9a - 8$ |

- | | |
|-------------------|----------------------|
| 1. $a^2 + 2a - 4$ | 4. $4x^3 - 4x^2 - 4$ |
| 2. $3x^2$ | 3. $2 + 3y^2 + 3y$ |
| 5. $a^3 + a^2$ | 6. $2x^2$ |
| 7. $2b^3 + 2b^2$ | 8. $6a^2b$ |
| 9. $2a^2 + 10a$ | 10. $10a^2 - 9a - 8$ |

Memo

Gr 8 Wiskunde | Mathematics

algebra (3)

- Terme, konstantes, Veranderlikes, koëffisiënt...
Terms, constants, variables, coefficient ...

$$4x^3 + 2x^2 - 4x + 6$$

- Hoeveel terme? + - • How many terms?
 ↳ word deur + en - geskei ↳ separated by + and -
 ↳ kyk eers of jy nie kan vereenvoudig nie. ↳ always check if you can't simplify first.

$$4x^3 + 2x^2 - 4x + 6$$

- Wat is die veranderlikes? • What are the variables?
 ↳ Verander = nie dieselfde ↳ variable → not the same
 ↳ alfabet letters ↳ alphabet letters

$$4x^3 + 2x^2 - 4x + 6$$

- Wat is die konstante? • What is the constant?
 ↳ konstant = altyd selfde ↳ constant = the same
 ↳ getal sonder alfabet ↳ number without alphabet

$$+ 6$$

$$4x^3 + 2x^2 - 4x + 6$$

- Wat is die koëffisiënt? • What is the coefficient?
 ↳ wat voor x staan
 ↳ Koëff van x ? -4 ↳ what is in front of x ? -4
 x^2 ? +2 ↳ Coeff of x^2 ? +2
 x^3 ? 4 ↳ Coeff of x^3 ? 4

8.3.3

(2)

kan jy vereenvoudig? ✗
 can you simplify? ✗

a) $3x^2 + 5x - 1$

1. Hoeveel terme is daar?

How many terms are there?

$\overset{①}{3}x^2 + \overset{②}{5}x - \overset{③}{1}$ 3

2. Wat is die veranderlikes?

What are the variables?

x

3. Wat is die konstante? — 1

What is the constant?

4. Wat is die koëffisiënt van x ? $3x^2 + 5x - 1$

What is the coefficient of x ? + 5

b) $2a^3 - 3a^2 + a + 2a^2 + 6$ - kan jy vereenvoudig? ✓
 can you simplify? ✓

$$= \underbrace{2a^3 - 1a^2}_{\text{gebruik die! / use this!}} + \underbrace{a + 6}$$

1. Hoeveel terme is daar?

How many terms are there?

$\overset{①}{2}a^3 - \overset{②}{1}a^2 + \overset{③}{1}a + \overset{④}{6}$

4

2. Wat is die veranderlikes?

What are the variables?

a

3. Wat is die konstante?

What is the constant?

+ 6

4. Wat is die koëffisiënt van a^2 ? $2a^3 - 1a^2 + a + 6$

What is the coefficient of a^2 ? of $2a^3 - a^2 + a + 6$

- 1

8.3.3

(3)

Pasop vir :

- $a^3 + 2a^2 - 4a + 3a^2 - 2a + 6$
↳ vereenvoudig! $a^3 + 5a^2 - 6a + 6$
- $2x^2 - 3x + 2y - 6$
↳ veranderlikes? x en y
- $2x^2 + 4x$
↳ konstante? 0
- $3a^2 + 2ab - b^2 - 6$
↳ koëff van b ? $+2a$
- $4x^2 - \frac{x}{2} + 2$
↳ koëff van x ? $-\frac{1}{2}$

Watch out for :

- $a^3 + 2a^2 - 4a + 3a^2 - 2a + 6$
↳ Simplify! $a^3 + 5a^2 - 6a + 6$
- $2x^2 - 3x + 2y - 6$
↳ variables? x and y
- $2x^2 + 4x$
↳ constant? 0
- $3a^2 + 2ab - b^2 - 6$
↳ coeff of b ? $+2a$
- $4x^2 - \frac{x}{2} + 2$
↳ coeff of x ? $-\frac{1}{2}$

Def | Ex

- $8x^2 - 4x + 10$
- $-3a^2 + 5a - 8$
- $2x^3 - 2x^2 + x + 2x - 6$
- $-y^2 + 3y + 3y^2 - 2$
- $4a^3 - 2a + 4 + 3a^2$

Beantwoord | Answer

Hoeveel terme?
- Wat is die konstante?
- Wat is die veranderlike?
- Koëff van x, x^2, x^3 ens.

How many terms?
- What is the constant?
- What is the variable?
- Coeff of x, x^2, x^3 etc.

$a^3 + 4$	$x^3 + 2$	$8 = x$
$a^2 + 3$	$x^2 + 2$	$4 = x$
(p)	(p)	(p)
a	y	x
$b + 4$	$b - 2$	$b = 4$
4	4	$3(a)$
$5a$	3	$2(a) 3$
		$\Sigma (a) 3$
		Memo

Gr 8 Wiskunde | Mathematics... A · L · G · E · B · R · A .. (4) ..Substitusie | Substitution

= Vervang () = Replace ()

Vervang ALTYD in (hakies)!

Always replace in (brackets)!

1. Wanneer gebruik ons die?

When do you use this?

waardes word gegee vir alfabetletters...

values are given to alphabet letters...

a) Bereken | Calculate :

As / if $x = 2$, $y = 3$

1) $2x + 4y$

$= 2() + 4()$

$= 2(2) + 4(3)$

$= 4 + 12$

$= 16$

2) $x^2 + 4x + 3$

$= ()^2 + 4() + 3$

$= (2)^2 + 4(2) + 3$

$= 4 + 8 + 3$

$= 15$

3) $6xy - 10$

$= 6()() - 10$

$= 6(2)(3) - 10$

$= 36 - 10$

$= 26$

1) * Gee vir elke letter 'n kleur* Give each letter a colour2) * Vervang die letter met die kleur ()* Replace the letter with that colour ()3) * Skryf getal binne ()* Write number inside ()4) * Skryf mooi onder mekaar.* Write neatly below each other.

b) Bereken | Calculate:

As | if

$a = -2$

$b = 3$

$c = 1$

1) $2a - b + 3c$

$= 2() - () + 3()$

$= 2(-2) - (3) + 3(1)$

$= -4 - 3 + 3$

$= -4$

$$\left\{ \begin{array}{l} ! + x + = + \\ ! + x - = - \\ - x + = - \\ - x - = + \end{array} \right.$$

2) $a^2 + 4c - b^2$

$= ()^2 + 4() - ()^2$

$= (-2)^2 + 4(1) - (3)^2$

$= 4 + 4 - 9$

$= -1$

- slegs letters kry (), die res "copy & paste" jy...
- only the letters get (), the rest you "copy & paste"...

3) $\frac{-4a + 2b}{3c}$

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

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

$= \frac{8 + 6}{3}$

$= \frac{14}{3}$

$= 4 \frac{2}{3}$

• Moet nie stappe uitlos nie.

• Do not skip steps!

Oef | ExBereken | Calculate :

1) As | if $x = 3, y = 2, z = 1$

a) xyz

b) $2x - 4z + y$

c) $-2y^2 + 4x$

2) As | if $a = -2, b = -1$

a) $ab - a$

b) $2a + 3b - 2$

c) $-b^2 + 4a^2$

c) 15

b) -9

2a) 4

4 (c)

4 (b)

9 (b)

Memo

Gr 8 Wiskunde / Mathematics

Algebra (5)

Vergelykings 1 / Equations 1

TIPE 1 / TYPE 1

$$1. \quad x + 2 = 6$$

• Wat + 2 is 6? 4
 • What + 2 is 6?

Hoe los ons dit op?

How do we solve this?

KRY X ALLEEN!

GET X ALONE!

Wiskundig: Om van getalle ontslae te raak, doen ons die inverse/teenoorgestelde bewerkings!

Mathematically: To get rid of numbers, we do the inverse / opposite.

$$x + 2 = 6 \quad \cdot \text{ om } + 2 \text{ "weg" te kry? } -2$$

$$x + 2 - 2 = 6 - 2 \quad \cdot \text{ wat jy links doen, doen jy regs}$$

$$x = 4 \quad \cdot \text{ to get rid of } +2? -2$$

$\therefore x = 4$ • what you do on the left, you do on the right.

"Kortpad" / "Shortcut"

$$x + 2 = 6$$

$$x = 6 - 2$$

$$x = 4$$



• "vat oor" + teken verander.

• "take over" + change sign.

$$2. \quad x - 4 = 2$$

-4 is in die pad } KRY X ALLEEN
 is in the way } GET X ALONE

$$x = 2 + 4$$

$$x = 6$$

$$3. \quad x + 10 = 12$$

+10

"vat oor" en verander teken
 "take over" and change sign

$$x = 12 - 10$$

$$x = 2$$

8.3.5
②

4.

$$-x - 5 = 10$$

$$-x = 10 + 5$$

$$\therefore x = 15$$

wat nou? what now?

$$x = -15$$

verander ALBEI kante se tekens
change BOTH sides' signs.

5.

$$6 = x - 1$$

$$6 + 1 = x$$

$$\therefore x = 7$$

- x is die belangrike een.
- x is the important one.

TIPE 2 / TYPE 2

1. $2x = 10$

• $2x$ beteken $2 \times x$ • $2x$ means $2 \times x$ "2 maal (wat) is 10?" 2×5 "2 times (what) is 10?" 2×5 KRY x ALLEEN!GET x ALONE!

$$\frac{2x}{2} = \frac{10}{2}$$

$$x = 5$$

• Om $2 \times x \rightarrow$ die 2 weg te kry?• In $2 \times x \rightarrow$ to get rid of 2? $\frac{1}{2}$ • BE FAIR \leftarrow altwee kante both sides

2. $3x = 15$

$$\frac{3x}{3} = \frac{15}{3}$$

$$x = 5$$

• 3 sit vas aan x ?3 is stuck to x ? $\frac{1}{3}$

3.

$2x = 20$

$$\frac{2x}{2} = \frac{20}{2}$$

$$x = 10$$

• $\frac{1}{2}$ albei kante om 2 weg te kry• $\frac{1}{2}$ on both sides to get rid of 2.

8.3.5
③

4. $3a = 2$

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

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

a is die belangrike outjie hier.
a is the important guy here.

Kan breuke antw kry ✓
Can have fraction answers ✓

5. $-3x = 9$

$$\frac{-3x}{-3} = \frac{9}{-3}$$

$$x = -3$$

Wat ookal voor x is → whatever is in front of x

ALTWEE KANTE | BOTH SIDES!

Def / Ex

1. $a + b = 10$

6. $5x = 20$

2. $x - 2 = 3$

7. $3a = 12$

3. $10 = x + 12$

8. $-2x = 14$

4. $4+x = 5$

9. $10m = -100$

5. $x - 1 = 0$

10. $6x = 3$

$$\begin{aligned} L - &= x \\ -z &= -z \\ -zx &= 14 \end{aligned}$$

$$\begin{aligned} x &= 1 \\ +x &= 5 - 4 \\ 4 + x &= 5 \end{aligned}$$

$$\begin{aligned} a &= 4 \\ \frac{3a}{3} &= \frac{12}{3} \\ 3a &= 12 \end{aligned}$$

$$\begin{aligned} -2 &= x \\ 10 - 12 &= x \\ 10 - 12 &= -2 \end{aligned}$$

$$\begin{aligned} x &= \frac{1}{2} \\ x &= \frac{6}{3} \\ 6x &= 3 \\ 6x &= 3 \\ 6x &= 3 \end{aligned}$$

$$\begin{aligned} x &= 4 \\ \frac{5x}{5} &= \frac{20}{5} \\ 5x &= 20 \end{aligned}$$

$$\begin{aligned} x &= 5 \\ x &= 3+2 \\ x &= 5 \end{aligned}$$

$$\begin{aligned} m &= -10 \\ \frac{10}{10}m &= -\frac{100}{10} \\ 10m &= -100 \end{aligned}$$

$$\begin{aligned} x &= 0+1 \\ x-1 &= 0 \\ x-1 &= 0 \end{aligned}$$

$$\begin{aligned} a &= 4 \\ a &= 10 - 6 \\ a &= 4 \end{aligned}$$

Memo

algebra (6)

Vergelykings (2) / Equations (2)TIPE 3 / TYPE 3

$$1. \frac{x}{3} = 10$$

raak van 3 ontslae
get rid of the 3...

$$\frac{x}{3} \times \frac{3}{1} = \frac{10}{1} \times \frac{3}{1}$$

$$x = 30$$

Kry x alleen!

Get x alone!

"Om al nader aan die x te kom,
moet jy van "buite" af al hoe nader
aan x beweeg. Breuke is soos dubbel
verdieping huise. Mens loop onder in"

"To get closer to the x, you have to
move from the outside-in. Fractions
are like double-storey houses. You have
to enter at the bottom"

$\div \frac{x}{3} \div$ om \div weg te kry? $\times 3$
to get rid of \div ? $\times 3$

$$2. \frac{a}{5} = 2$$

$$\frac{a}{5} \times \frac{5}{1} = \frac{2}{1} \times \frac{5}{1}$$

$$a = 10$$

raak van 5 ontslae
get rid of 5

$\times 5$

ALTWEË KANTE
BOTH sides

$$3. \frac{m}{12} = 10$$

$$\frac{m}{12} \times \frac{12}{1} = \frac{10}{1} \times \frac{12}{1}$$

$$m = 120$$

raak van 12 ontslae
get rid of 12 $\times 12$

$$4. \frac{x}{2} = 1$$

$$\frac{x}{2} \times \frac{2}{1} = \frac{1}{1} \times \frac{2}{1}$$

$$x = 2$$

raak ontslae van 2
get rid of 2 $\times 2$

Onthou om regverdig te wees X albei kante
Remember to be fair X both sides

5. $\frac{2}{x} = 10$ Dieselfde prosedure
What ??? Same method!

$$\begin{aligned}\frac{2}{x} \times \frac{x}{1} &= \frac{10}{1} \times \frac{x}{1} \\ 2 &= 10x \quad \div 10 \text{ albei kante both sides.} \\ \frac{2}{10} &= \frac{10x}{10} \\ \frac{1}{5} &= x\end{aligned}$$

TIPE 4 | TYPE 4 ()

1. $2(x+1) = 8$ Wat beteken ()?

$$2 \overbrace{(x+1)}^x = 8$$

$$2x + 2 = 8$$

NB (Sal in volgende deel aangaan / will finish in next set)

What does () mean?

Reënboog X
Rainbow X

$$2(x+1)$$

↳ 2 staan voor die huis, hy "groet" almal in die "huis"...

↳ 2 stands in front of the house, he "greets" everyone inside...

2. $3(a+4) = 6$

$$3a + 12 = 6$$

NB (NOT DONE!)

$$\begin{aligned}3. \quad 2 \overbrace{(x+4)}^x &= 3 \overbrace{(x+1)}^x \\ 2x + 8 &= 3x + 3\end{aligned}$$

NB (NIE KLAAR!)

$$4. \quad 10(x+4) = x(2+3) \rightarrow \text{Maak eers binne klaar!}$$

$$10 \overbrace{(x+4)}^x = x \overbrace{(5)}^x$$

$$10x + 40 = 5x$$

Finish inside first!

NB (NOT DONE!)

Gr 8 Wiskunde / Mathematics

Algebra (7)

Kombinasies Vergelykings (3) Combined Equations (3)

[Lees asb my "storie"...

- Jy wil iets vir die "x" in persoon gee.
- Jy moet eers verby 'n paar "mense" kom
- Jy raak eerste van die persoon in die tuin ontslae

"werk van buite af al hoe nader na x"

$$\frac{2(x+3)}{3}$$

[Please read my "story"]

- You want to give something to the "x".
- You have to get past a couple of "people" first.
- You get rid of the person in the front yard first

"work your way closer from the outside"

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

$$\frac{2(x+3)}{3} = 6$$

- Gaan by "onderste" verdieping in $\times 3$

"niemand bars net by die boonste verdieping nie"

$$\frac{2(x+3)}{3} \times \frac{3}{1} = \frac{6}{1} \times \frac{3}{1}$$

- Enter at the "bottom" of the house $\times 3$

"no-one just bursts in on the top storey of a house"

- Jy groet mooi almal wat by "x" is.

$$2(x+3) = 18$$

$$2x + 6 = 18$$

- Begin weer...

- You greet everyone that is with "x"

$$2(x+3) = 18$$

$$2x + 6 = 18$$

- Start again ...

$$2x + 6 = 18$$

$$2x = 18 - 6$$

$$2x = 12$$

• Kry x alleen \div

• Giet x alone \div

$$\frac{2x}{2} = \frac{12}{2}$$

$$x = 6$$

KLAAR!

DONE!

Vb1 $3x + 2 = 11$

$$3x = 11 - 2$$

{ los 11 eerste
leave 11 first

$$3x = 9$$

$$\frac{3x}{3} = \frac{9}{3}$$

$$x = 3$$

2. $\frac{x}{2} - 4 = 2$

$$\frac{x}{2} = 2 + 4$$

$$\frac{x}{2} \times \frac{2}{1} = 6 \times \frac{2}{1}$$

$$x = 12$$

3. $2(x+1) = 8$ (van 7.3.6 af)

$$2x + 2 = 8$$

$$2x = 8 - 2$$

$$2x = 6$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$x = 3$$

4. $3(a+4) = 6$

$$3a + 12 = 6$$

$$3a = 6 - 12$$

$$3a = -6$$

$$\frac{3a}{3} = \frac{-6}{3}$$

$$a = -2$$

③

5. $2(x+4) = 3(x+1)$

$$2x + 8 = 3x + 3$$

Sit soort by soort
Same - same together

$$2x - 3x = 3 - 8$$

$$\begin{aligned} -1x &= -5 \\ x &= 5 \end{aligned}$$

$$\frac{-1x}{-1} = \frac{-5}{-1}$$

Jy moet altyd x oplos, nie $-x$ nie!
You should always solve x , not $-x$!

6. $10(x+4) = x(2+3)$

$$\begin{aligned} 10(x+4) &= x(5) \\ 10x + 40 &= 5x \end{aligned}$$

$$10x - 5x = -40$$

$$5x = -40$$

$$\frac{5x}{5} = \frac{-40}{5}$$

$$x = -8$$

7. $\frac{3}{2}x \cdot \frac{2}{3}x = 4 \times \frac{3}{2}$

$$x = \frac{4}{1} \times \frac{3}{2}$$

$$x = \frac{12}{2}$$

$$x = 6$$

$\left\{ \begin{array}{l} \text{Om } \frac{2}{3} \text{ "weg" te kry } x^{\frac{3}{2}} \text{ (inverse)} \\ \text{To get "rid" of } \frac{2}{3} \times \frac{3}{2} \end{array} \right.$

Daar is nie 'reëls' vir antwoorde nie, dit kan heelgetalle of breuke wees ...

There are no "rules" for answers, it can be integers or fractions ...