

Wednesday, 03 March 2021



Simplifying Expressions

Learning Objective:

Be able to simplify expressions by collecting like terms

Algebra



- Algebra is a special language in maths that uses letters to represent numbers that you do not know
- In algebra, we don't use a multiplication symbol. So rather than ' $2 \times s$ ', we write $2s$, rather than ' $8 \times y$ ' we write $8y$
- $2s$ means 2 lots of 's'. This is the same as $s + s$



Like terms

- $9b$, $-7b$, $13b$ are like terms
- $2x$, x , $-3x$ are like terms
- $7y$, y , $-8y$ are like terms

- $6t$, $5x$ and $-11z$ are not like terms. We cannot add or subtract these.
- So $3t + 4n = 3t + 4n$
- It cannot be simplified.

Unlike terms

Challenge

- Can you write definitions for:
 - Expression, Simplify, Like Terms, Terms
-
- These will be your key words today

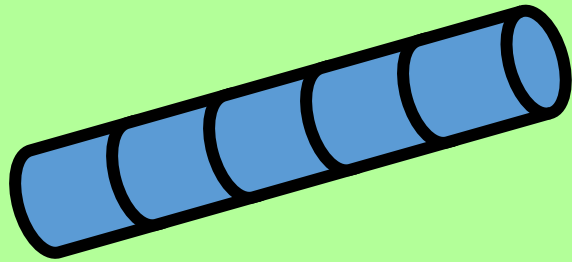




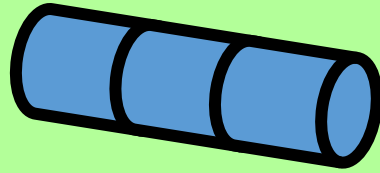
Challenge

- Can you write definitions for:
- Expression, Simplify, Like Terms, Terms
- A **term** is part of an **expression**
- **Like terms** contain the same letter
- You can **simplify** an expression by collecting like terms

Two pipes of lengths $5a$ and $3a$ are joined together



$5a$



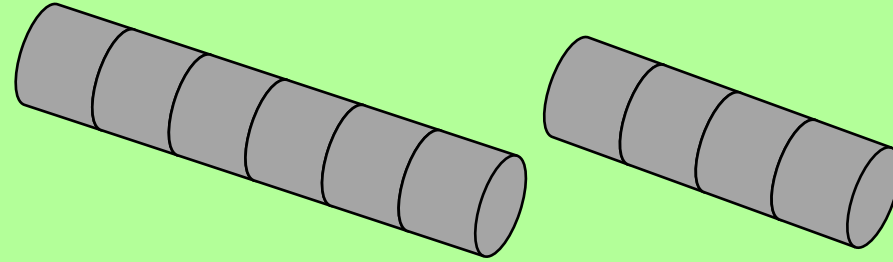
$3a$

- The total length = $5a + 3a = 8a$
- **$5a$** and **$3a$** are like terms
- They can be combined, or collected together

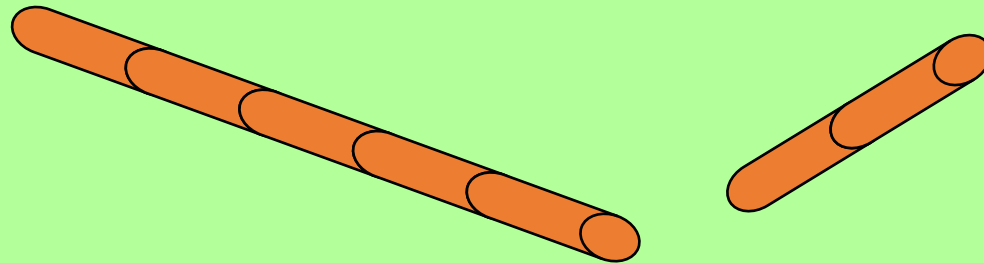


Write the total lengths of these pipes when the two parts are joined together

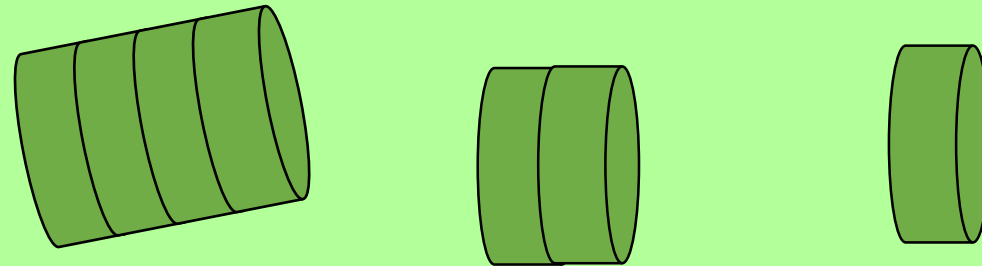
- 1a) $6x + 4x =$



- 1b) $5y + 2y =$



- 1c) $4z + 2z + z =$



Worked Example

Simplify

$$a + a + a$$

Simplify

$$2a + a + 3a$$

Student Example

Simplify

$$b + b + b + b$$

Simplify

$$4b + b + 2b$$



Worked Example

Simplify

$$a + a - a$$

Simplify

$$2a - a + 3a$$

Student Example

Simplify

$$b + b - b + b$$

Simplify

$$4b - b + 2b$$



Simplify:

Q1) $a + a + a$

$3a$

Q2) $b + b - b$

b

Q3) $2c + c - c$

$2c$

Q4) $4d - d + 2d$

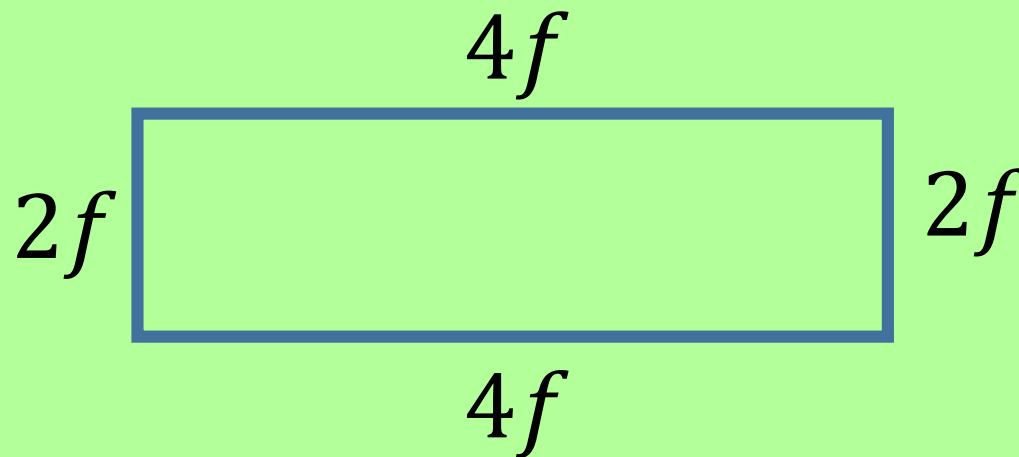
$5d$

Q5) $4e - e - 2e$

e



Write an expression for the perimeter of the rectangle:



$12f$

Worked Example

Simplify

$$a + 3b + a$$

Simplify

$$4a + 2b + 3 + b$$

Student Example

Simplify

$$2c + c + b$$

Simplify

$$3a + b + 4 + 2a$$



Worked Example

Simplify

$$4a + 2b - 3a - 1$$

Simplify

$$2a - 4b + 3a + b$$

Student Example

Simplify

$$3a - 2b - a - 1$$

Simplify

$$5a - 5b - 3a + 2b$$



Simplify:

$$\text{Q1)} \quad a + b + a + 3 \\ \quad \quad \quad 2a + b + 3$$

$$\text{Q2)} \quad 4a + 3b + b - 3 \\ \quad \quad \quad 4a + 4b - 3$$

$$\text{Q3)} \quad 4 + 3b - b + 2a \\ \quad \quad \quad 2a + 2b + 4$$

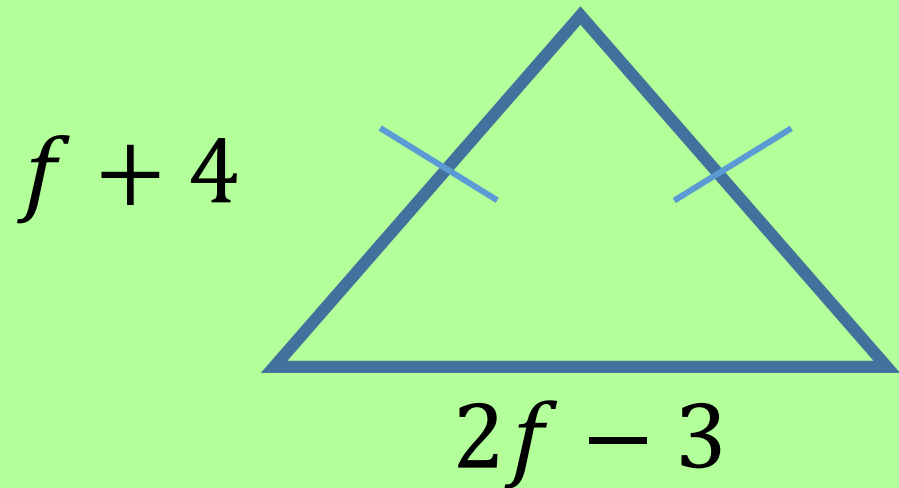
$$\text{Q4)} \quad 4 - 3b + 2b - 2a \\ \quad \quad \quad -2a - b + 4$$

$$\text{Q5)} \quad 4a - 3b - 2b - 6a \\ \quad \quad \quad -2a - 5b$$



Write an expression for the perimeter of the triangle:

$$f + 4 + f + 4 + 2f - 3 = 4f + 5$$



Worked Example

Simplify

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

Simplify

$$5x^2 + 2x - 3x^2 + 3x$$

Student Example

Simplify

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

Simplify

$$5x^2 - 4x - 2x^2 + 3x - 2$$



Simplify:

Q1) $2x^2 + 4x + 5x^2$

$$7x^2 + 4x$$

Q2) $2x^2 + 4x + 5x^2 + 3x$

$$7x^2 + 7x$$

Q3) $2x^2 - 4x + 5x^2 + 3x$

$$7x^2 - x$$

Q4) $2x^2 - 4x + 5x^2 + 3x - 6$

$$7x^2 - x - 6$$

Q5) $2x^3 - 4x^2 + 5x^3 + 3x - 6x^2$

$$7x^3 - 10x^2 + 3x$$



*Write 3 Expressions which
simplify to*

$$3x^2 - x$$

Plenary



Simplify the following expressions

a) $a + a + a + a$

$4a$

b) $2b - b + 2b$

$3b$

c) $3a - 2b + 4a + 5b$

$7a + 3b$

d) $3x^2 + 3x + 2x^2 - x$

$5x^2 + 2x$

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

$x^2 + 2x - 1$