SIMPLIFYING ALGEBRAIC EXPRESSIONS

LO: To simplify algebraic expressions.

22 September 2025

Week 5, Day 1

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MENTAL MATHS:

1) 10 (-12)

2) 20+(-10)

3) (-27) ÷ 3

4) 15 – (-7)

5) -13 + 35

6) -12(-7)

7) -21 + 18

8) 35 – (-45)

9) 27 – (-8)

10) -56 ÷ 8

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MENTAL MATHS: ANSWERS

1) $10\ (-12) = -120$

2) $20+(-10) = 10$

3) $(-27) \div 3 = -9$

4) $15 - (-7) = 22$

5) $-13 + 35 = 22$

6) $-12(-7) = 84$

7) $-21 + 18 = -3$

8) $35 - (-45) = 80$

9) $27 - (-8) = 35$

10) $-56 \div 8 = -7$

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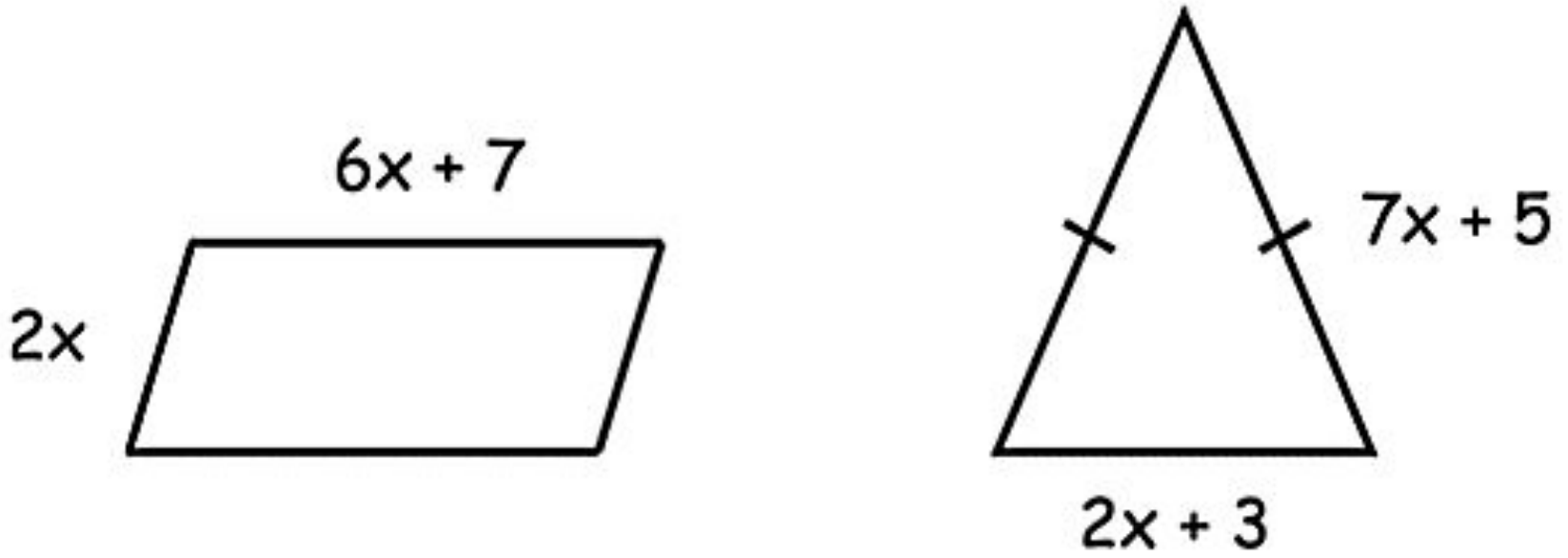
STARTER:

Below is a parallelogram and an isosceles triangle.



Which shape has the greatest perimeter?
Show your working.

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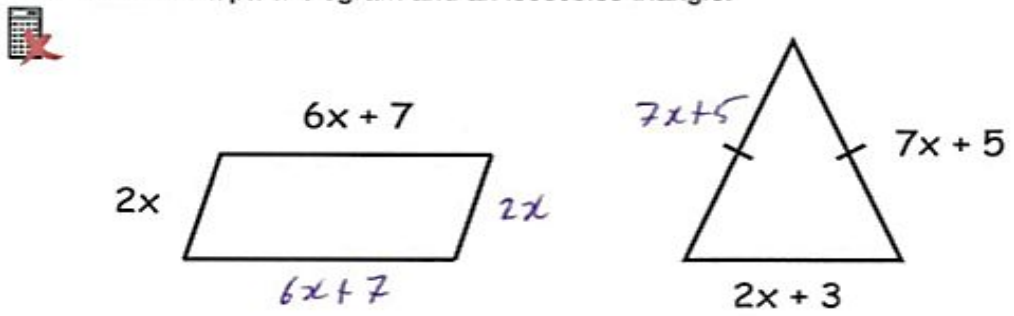
STARTER:

24. Below is a parallelogram and an isosceles triangle.



Which shape has the greatest perimeter?
Show your working.

Parallelogram $2x + 6x + 7 + 2x + 6x + 7 = 16x + 14$

Triangle $7x + 5 + 7x + 5 + 2x + 3 = 16x + 13$

Parallelogram

(3)

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GCSE/iGCSE Assessment Objective Specification – Foundation/Higher

A	understand that symbols may be used to represent numbers in equations or variables in expressions and formulae

B	understand that algebraic expressions follow the generalised rules of arithmetic

A	evaluate expressions by substituting numerical values for letters
B	collect like terms

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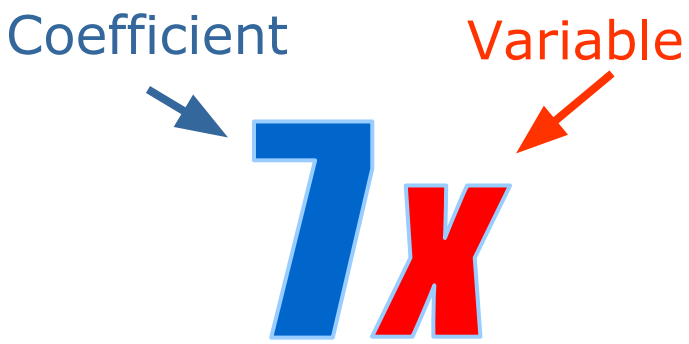
KEY CONCEPT:

In the expression $7x + 9y + 15$, $7x$, $9y$, and 15 are called *terms*. A term can be a number, a variable, or a product of numbers and variables. Terms in an expression are separated by + and –.

$$\underbrace{7x}_{\text{term}} + \underbrace{5}_{\text{term}} - \underbrace{3y^2}_{\text{term}} + \underbrace{y}_{\text{term}} + \underbrace{\frac{x}{3}}_{\text{term}}$$

In the term $7x$, 7 is called the *coefficient*. A coefficient is a number that is multiplied by a variable in an algebraic expression. A variable by itself, like y, has a coefficient of 1. So $y = 1y$.



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KEY CONCEPT:

Like terms are terms with the same variable raised to the same power. The coefficients do not have to be the same. Constants, like 5, $\frac{1}{2}$, and 3.2, are also like terms.

Like Terms	$3x$ and $2x$	w and $\frac{w}{7}$	5 and 1.8
Unlike Terms	$5x^2$ and $2x$ *The exponents are different.*	$6a$ and $6b$ *The variables are different*	3.2 and n *Only one term contains a variable*

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KEY CONCEPT:

Check It Out: Example 1

Identify like terms in the list.

$2x$ $4y^3$ $8x$ $5z$ $5y^3$ $8z$

Look for like variables with like powers.

$2x$ $4y^3$ $8x$ $5z$ $5y^3$ $8z$

Like terms: $2x$ and $8x$ $4y^3$ and $5y^3$ $5z$ and $8z$

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MINI PLENARY:

Identify like terms in the list.

1. $3n^2$ $5n$ $2n^3$ $8n$ — $5n$, $8n$

2. a^5 $2a^2$ a^3 $3a$ $4a^2$ — $2a^2$, $4a^2$

Simplify. Justify your steps using the Commutative, Associative, and Distributive Properties when necessary.

3. $4a + 3b + 2a$ — $6a + 3b$

4. $x^2 + 2y + 8x^2$ — $9x^2 + 2y$

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KEY CONCEPT:

Additional Example 2: Simplifying Algebraic Expressions

Simplify. Justify your steps using the Commutative, Associative, and Distributive Properties when necessary.

C. $3a^2 + 5b + 11b^2 - 4b + 2a^2 - 6$

$3a^2 + 5b + 11b^2 - 4b + 2a^2 - 6$ *Identify like terms.*

$(3a^2 + 2a^2) + (5b - 4b) + 11b^2 - 6$ *Group like terms.*

$5a^2 + b + 11b^2 - 6$ *Add or subtract the coefficients.*

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✓	**B** understand that algebraic expressions follow the generalised rules of arithmetic
✓	**A** evaluate expressions by substituting numerical values for letters
✓	**B** collect like terms

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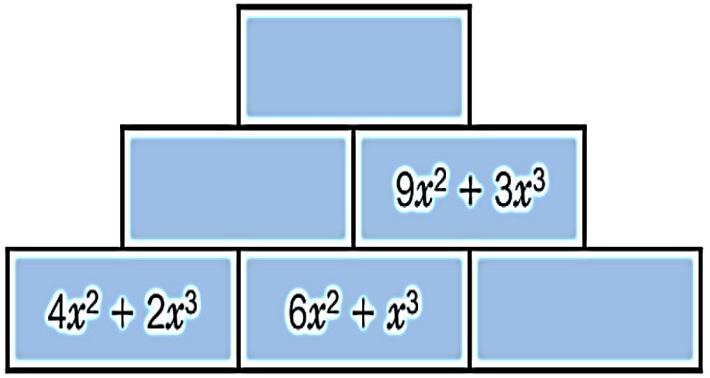
CORE TASK

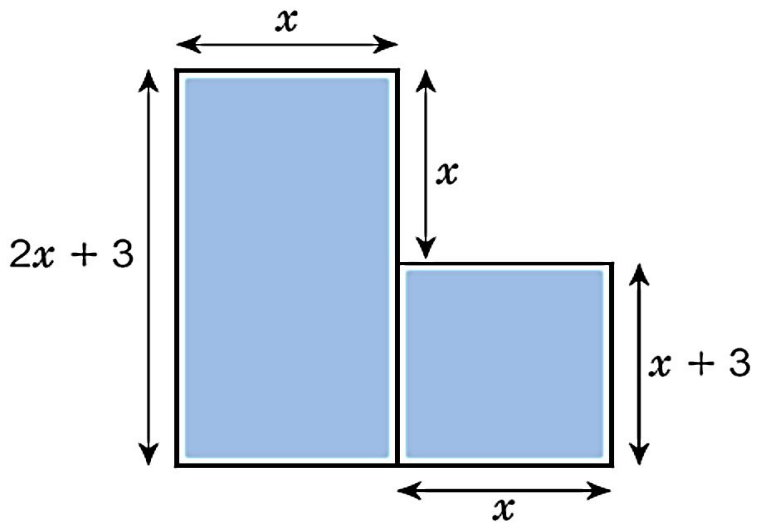
Task 1

Copy and complete this addition pyramid.
Each brick is the sum of the two bricks below it.



Extension

Write an expression for the total area of this shape.



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CORE TASK

Task 2

A tile manufacturer makes two square ceramic tiles. The smaller tile has sides of length x cm. The larger tile has sides that are three times those of the smaller tile.

a Write an expression, in terms of x, for the length of each side of the large tile.

b Write expressions for the area of each tile.

c Write an expression for the total area of a small and a large tile together. Write your expression in its simplest form.

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CORE TASK

Task 3

Real A sculptor makes two cubes out of concrete. The smaller cube has side length x cm.
The larger cube has a side length 3 times the length of the smaller cube.

a Write an expression, in terms of x, for the side length of the larger cube.

b Write an expression for the volume of each cube.

c Write an expression for the total volume of concrete needed for both cubes. Write your expression in its simplest form.

d Use your answer to part **c** to work out the total volume of concrete needed for both cubes when $x = 10$ cm.

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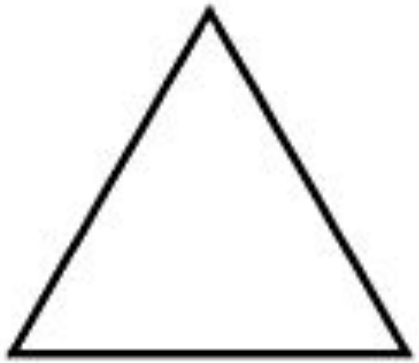
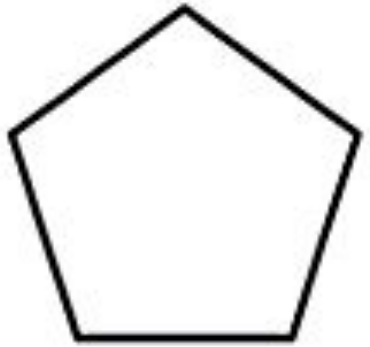
Extension Task

Here is an equilateral triangle and a regular pentagon.



$2x + 30$



The perimeter of the two shapes are equal.

Find an expression for the length of each side of the regular pentagon.

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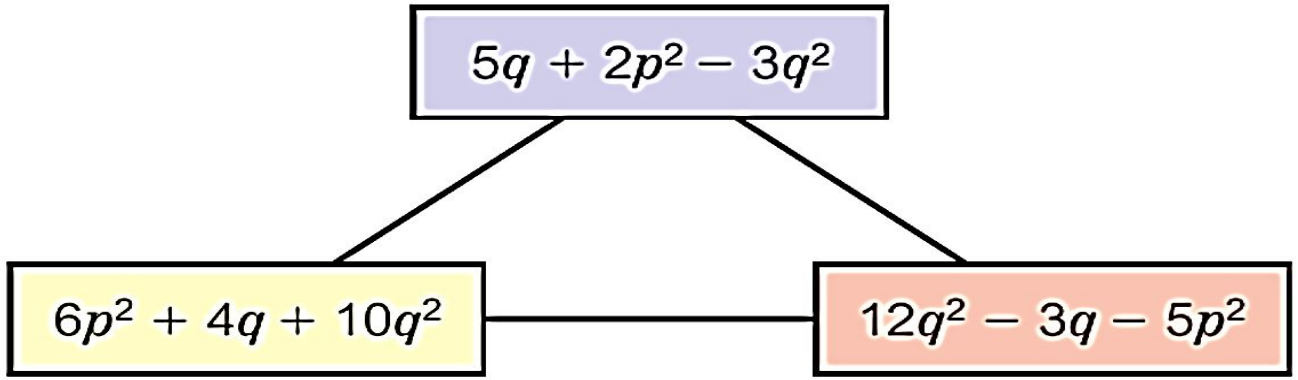
PLENARY

a Add together two of the expressions linked by lines.



b Repeat part **a** in as many different ways as you can.

c Add all three expressions together.

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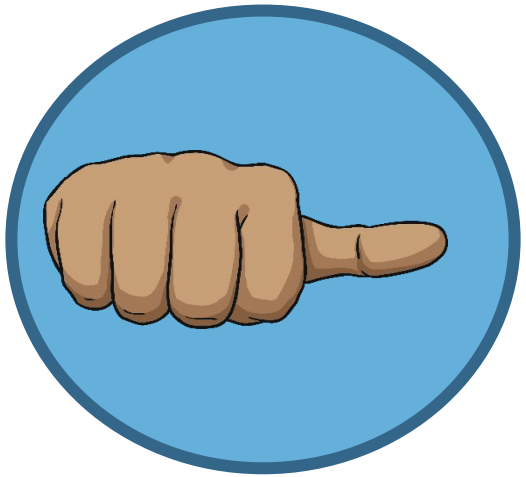
Self Check

Secure



Met

Working Towards