Your notes

GCSE Maths: revision notes

Substitution and formulae

Contents

1. Substitution
2. Using formulae
3. Writing formulae
4. Worked examples
5. Key terms
6. Quick questions
7. What to do next

Substitution

- Substitution means replacing letters with numbers: if $a = 3$ and $b = 5$, then $2a + b = 6 + 5 = 11$.
- Use brackets for negative numbers: if $x = -2$, then $x^2 = (-2)^2 = 4$, and $3x^2 = 3 \times 4 = 12$.
- Follow BIDMAS: $3x^2$ means square x first, then multiply by 3.

Using formulae

- Write the **formula**, **substitute**, then calculate: $v = u + at$ with $u = 5$, $a = 2$, $t = 3$ gives $v = 5 + 6 = 11$.
- $A = \frac{1}{2}bh$ with $b = 8$ and $h = 5$ gives $A = 20$.
- $F = 9C/5 + 32$ with $C = 20$ gives $F = 36 + 32 = 68$.

Writing formulae

- Turn words into a **formula**: a taxi charges £3 plus £2 per mile, so $C = 3 + 2m$.
- A plumber charges £35 plus £28 per hour: $C = 35 + 28h$.
- The perimeter of a square with side s is $P = 4s$.

Worked examples

Work out $v = u + at$ when $u = 5$, $a = -2$ and $t = 6$

Substitute the values. **$v = 5 + (-2) \times 6$**

Multiply first (BIDMAS). **$(-2) \times 6 = -12$**

Add. **$5 + (-12) = -7$**

Answer: $v = -7$

Key terms

Substitute	Replace a letter with a number.
Formula	A rule that shows how to work out one quantity from others.
Variable	A letter that stands for a quantity that can change.
Subject	The letter on its own on one side of a formula, such as v in v = u + at.
Evaluate	Work out the value.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. If a = 3 and b = 5, what is 2a + b?
2. If x = –2, what is x^2?
3. If x = 4, what is $3x^2$?
4. v = u + at. Find v when u = 5, a = 2 and t = 3.
5. A = ½bh. Find A when b = 8 and h = 5.
6. A taxi costs £3 plus £2 per mile. What does a 7-mile journey cost?
7. If p = –3 and q = 2, what is pq – q?
8. y = mx + c. Find y when m = 4, x = –1 and c = 7.

Answers

1. 11
2. 4
3. 48
4. 11
5. 20
6. £17
7. –8
8. 3

What to do next

Practise 12 questions on this topic

Try 6 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

Your notes