

Substitution

Name:

Date:

INQUIRY

The formula for Celsius to Fahrenheit is $F = 1.8C + 32$. Today it's 28 degrees C in Nanjing. What's that in Fahrenheit?

Discuss with your partner. Write your initial ideas below:

Key Vocabulary

Term	Definition
Substitution	Replacing a variable with a given number.
BIDMAS	Order of operations: Brackets, Indices, Division/Multiplication, Addition/Subtraction.

Part A — Basic Substitution

1. If $x = 4$, find: (a) $3x + 2$ (b) $5x - 7$ (c) $x^2 + 1$ [3 marks]

Show your working:

2. If $a = 3$ and $b = 5$, find: (a) $2a + b$ (b) $ab - 4$ (c) $a^2 + b$ [3 marks]

Show your working:

3. If $p = -2$, find: (a) $3p + 10$ (b) p^2 (c) $2p^2 - 1$ [3 marks]

Show your working:

4. If $m = 6$ and $n = -3$, find: (a) $m + 2n$ (b) mn (c) $m^2 - n^2$ [3 marks]

Show your working:

Part B — Real-World Formulas

5. Temperature: $F = 1.8C + 32$. Find F when: (a) $C = 28$ (Nanjing summer) (b) $C = -5$ (Nanjing winter) (c) $C = 35$ (Seoul summer) [3 marks]

Show your working:

6. Speed: $s = d / t$. The Nanjing to Shanghai train covers 300 km in 1.5 hours. Calculate the speed. [2 marks]

Show your working:

7. Area of a triangle: $A = 0.5 \times b \times h$. A triangular park in Nanjing has base 120 m and height 80 m. Find the area. [2 marks]

Show your working:

8. NIS pool perimeter: $P = 2(l + w)$. If $l = 25$ m and $w = 16$ m, find P . [2 marks]

Show your working:

Part C — Challenge

9. Berlin taxi cost: $C = 3.90 + 2.00d$. Nanjing taxi cost: $C = 11 + 2.40(d - 3)$ for $d > 3$ km. Compare the cost for a 10 km ride in each city. Which is cheaper? [4 marks]

Show your working: