Stimulus question 75

Finding the Right Formula

Teaching notes

Key question

All the situations on the right will have a Total Cost (£T), which is **always expressed in pounds** (£).
Some of the formulae on the left represent the situations described on the right. Match the ones that fit, by drawing connecting lines.
One situation does not match with any of the formulae. Write your own formula to match it in the space provided.

24n = £T + 11
50 + 24h = £T
11n + 50 = £T
50n + £T = 11
0.24D + 0.11k = £T
0.24k + 0.11D = £T
24 + 50h = £T
£T = 50 + 24D + 0.11k
24D + 11k = £T

A number of friends (n) bought their music festival tickets together online. The tickets were £50 each, but there was a single additional £11 administration charge.
A van hire company makes an initial charge of £50 plus £24 per day (D). They then charge the customer 11p for every mile (k) he or she drives in the van.
A number of people (n) shared the cost of a restaurant bill. They each paid £24. The group was then given £11 change.
An electricity bill (before VAT) is calculated by charging 11p per kilowatt-hour (k) of usage, plus a standing charge of 24p per day (D).
A plumber charges a callout fee of £50 and then £24 per hour (h) that she works.

Support/supplementary questions

- Why are some of the coefficients written as decimals?
- Why do some terms not have a symbol?
- Would it help if you tried to write your own versions of the situations in symbols, and then tried to match them?
- Do some of the formulae need rearranging?

Solutions and mark scheme

24n = £T + 11	A number of friends (n) bought their music festival tickets together online. The tickets were £50 each, but there was a single additional £11 administration charge.
50 + 24h = £T	A van hire company makes an initial charge of £50 plus £24 per day (D). They then charge the customer 11p for every mile (k) he or she drives in the van.
11n + 50 = £T	A number of people (n) shared the cost of a restaurant bill. They each paid £24. The group was then given £11 change.
50n + £T = 11	An electricity bill (before VAT) is calculated by charging 11p per kilowatt-hour (k) of usage, plus a standing charge of 24p per day (D).
0.24D + 0.11k = £T	A plumber charges a callout fee of £50 and then £24 per hour (h) that she works.
0.24k + 0.11D = £T	
24 + 50h = £T	
£T = 50 + 24D + 0.11k	
24D + 11k = £T	
50n + 11 = £T	

Mark scheme

Full credit

Selects the four correct answers from the list and adds a correctly written formula. The formula is written concisely.

Partial credit

Selects four correct answers from the list, but does not add a correct formula for the 'music festival' situation,
OR
Selects two or more correct answers from the list and adds a correct formula for the music festival.

No credit

Any other response

Developing numerical reasoning

Identify processes and connections

- Transfer mathematical skills across the curriculum in a variety of contexts and everyday situations;
- Prioritise and organise the relevant steps needed to complete the task or reach a solution;
- Select appropriate mathematics and techniques to use.

Represent and communicate

- Use appropriate notation, symbols and units of measurement.

Review

- Select and apply appropriate checking strategies.

GCSE Subject Content		
Foundation	**Intermediate**	**Higher**
Formation and manipulation of linear equations (formulae).		