Reasoning and Problem Solving
Step 4: Find a Rule – One Step

National Curriculum Objectives:

Mathematics Year 6: (6A1) Express missing number problems algebraically
Mathematics Year 6: (6A2) Use simple formulae

Differentiation:

Questions 1, 4 and 7 (Problem Solving)
Developing Select the true statement from three algebraic equations when given a one step rule. Whole numbers and addition, subtraction operations and multiplication by 2 used.
Expected Select the true statement(s) from three algebraic equations when given a one step rule. Whole numbers and all four operations used.
Greater Depth Select the true statement(s) from three algebraic equations when given a one step rule. Whole, decimal, fractions and negative numbers and all four operations used.

Questions 2, 5 and 8 (Problem Solving)
Developing Write an algebraic equation to describe the relationship between two whole items. Addition or subtraction only.
Expected Write an algebraic equation to describe the relationship between two whole items.
Greater Depth Write an algebraic equation to describe the relationship between two measurements using mixed metric units.

Questions 3, 6 and 9 (Reasoning)
Developing Find the odd one out between three algebraic equations that relate to a function machine. Whole numbers and addition, subtraction operations and multiplication by 2 used.
Expected Find the odd one out between three algebraic equations that relate to a function machine. Numbers with 1 decimal place and all four operations used.
Greater Depth Find the odd one out between three algebraic equations that relate to a function machine. Whole, decimal, fractions and negative numbers and all four operations used.

More Year 5 and Year 6 Algebra resources.

Did you like this resource? Don't forget to review it on our website.

1a. Jill has four more pets than Lark.

If Lark has *x* pets, which statement is true?

> A) Jill has *x* – 4 pets

> B) If Jill has 10 pets, Lark has 14

> C) Jill has *x* + 4 pets

D

6 PS

1b. Molly has twice as many shoes as James.

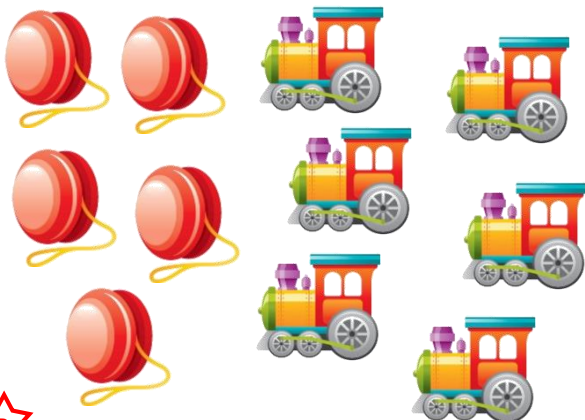If James has *y* shoes, which statement is true?

> A) Molly has 2*y* shoes

> B) Molly has 2 + *y* shoes

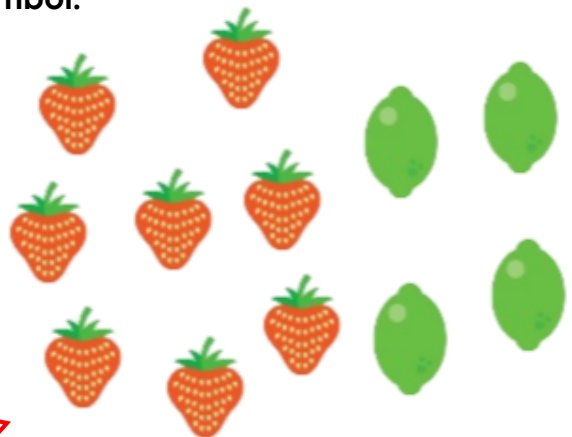> C) If Molly has 5 shoes, James has 10

D

6 PS

2a. Write an algebraic expression to show how many yoyos there are if trains equals *a*. Use an addition or subtraction symbol.
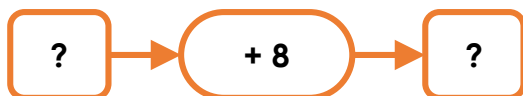
D

6 PS

2b. Write an algebraic expression to show how many limes there are if strawberries equals *y*. Use an addition or subtraction symbol.

D

6 PS

3a. Four of the cards are inputs or outputs of the function machine.

Circle the odd one out.

| 6 | 16 | 5 | 8 | 14 |

? → + 8 → ?

Explain your reasoning.

D

6 R

3b. Four of the cards are inputs or outputs of the function machine.

Circle the odd one out.

| 1 | 9 | 10 | 7 | 15 |

? → − 6 → ?

Explain your reasoning.

D

6 R

4a. Sandra has three times fewer spoons than Kyle.
If Sandra has x spoons, which of these are true?

A) Kyle has 3x spoons

B) Kyle has $x + x + x$ spoons

C) If Kyle had 18 spoons, Sandra had 54

6 PS

4b. Laura has seven fewer counters than D'Angelo.
If D'Angelo has c counters, which of these are true?

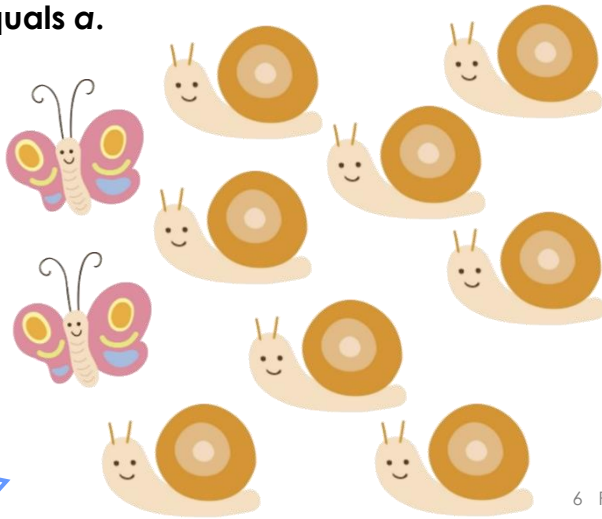A) Laura has $c − 7$ counters

B) Laura has $c + 7$ counters

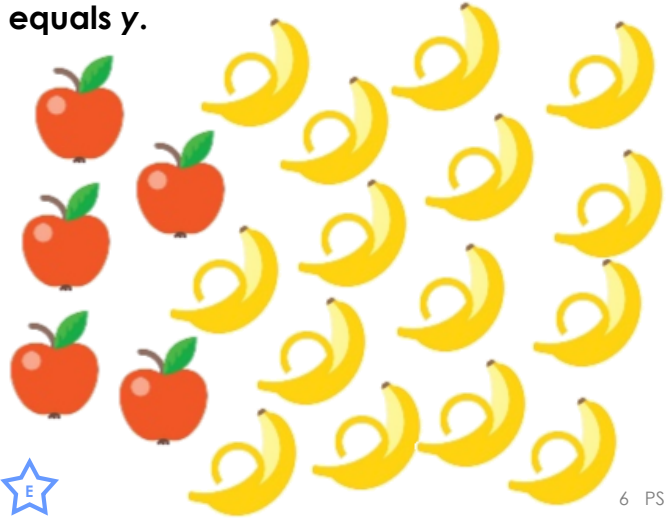C) If D'Angelo has 18 counters, Laura has 25

6 PS

5a. Write an algebraic expression to show how many butterflies there are if snails equals a.

6 PS

5b. Write an algebraic expression to show how many bananas there are if apples equals y.

6 PS

6a. Four of the cards are inputs or outputs of the function machine.
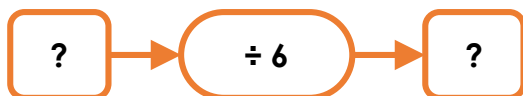
Circle the odd one out.

| 42 | 4.1 | 9 | 24.6 | 7 |

| ? | → | ÷ 6 | → | ? |

Explain your reasoning.

6 R

6b. Four of the cards are inputs or outputs of the function machine.

Circle the odd one out.

| 20.8 | 8 | 36 | 5.2 | 9 |

| ? | → | x 4 | → | ? |

Explain your reasoning.

6 R

7a. Mika has half as much on his credit card as Yasmin has in her bank account. If Yasmin has £x in her account, which of these are true?

> **A) Mika has $x - 2$ pounds**

> **B) If Mika has £17.54, Yasmin has £35.08**

> **C) Mika has $\dfrac{x}{2}$ pounds**

6 PS

7b. Davina has a quarter of the amount of orange juice that Jaxon has. If Jaxon has *b* ml of juice, which of these are true?

> **A) Davina has $\dfrac{b}{4}$ ml of juice**

> **B) If Davina has 120ml, Jaxon has 440ml**

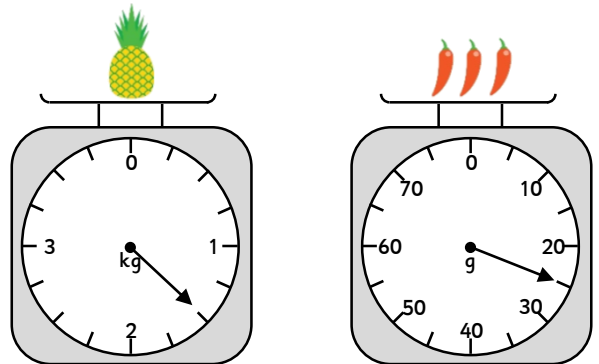> **C) Davina has $0.25b$ ml of juice**

6 PS

8a. Write an algebraic expression to show how much toothpaste there is if cleaning spray equals *z*.

50ml

0.25L

6 PS

8b. Write an algebraic expression to show the mass of the pineapple if the mass of the chillies equals *y*.

6 PS

9a. Four of the cards are inputs or outputs of the function machine.

Circle the odd one out.

| 21 | 48 | 12 | 28 | 36 |

? → x 0.75 → ?

Explain your reasoning.

6 R

9b. Four of the cards are inputs or outputs of the function machine.

Circle the odd one out.

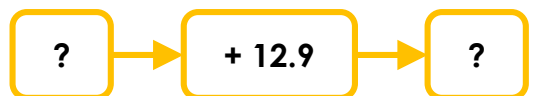| -18.3 | -16.6 | 3.7 | -5.4 | 16.6 |

? → + 12.9 → ?

Explain your reasoning.

6 R

Reasoning and Problem Solving
Find a Rule – One Step

Developing

1a. C

2a. $a - 1$

3a. 5 is the odd one out because 6 + 8 = 14 and 8 + 8 = 16. 5 + 8 = 13 but there is not a number card for 13.

Expected

4a. A and B

5a. Various answers, for example: $a ÷ 4$, $a - 6$, $a \times \dfrac{1}{4}$

6a. 9 is the odd one out because 42 ÷ 6 = 7 and 24.6 ÷ 6 = 4.1. 54 ÷ 9 = 6 but there is not a number card for 54.

Greater Depth

7a. B and C

8a. Various possible answers; for example: $z ÷ 5$, $z - 0.2L$, $\dfrac{1}{5}z$

9a. 12 is the odd one out because 28 x 0.75 = 21 and 48 x 0.75 = 36. 12 x 0.75 = 9 and 16 x 0.75 = 12 but there is not a number card for 9 or 16.

Reasoning and Problem Solving
Find a Rule – One Step

Developing

1b. A

2b. $y - 4$

3b. 10 is the odd one out because 15 – 6 = 9 and 7 – 6 = 1. 10 – 6 = 4 and 16 – 6 = 10 but there is not a number card for 4 or 16.

Expected

4b. A

5b. Various answers, for example: $y + 10$, $3y$, $y ÷ \dfrac{1}{3}$

6b. 8 is the odd one out because 5.2 x 4 = 20.8 and 9 x 4 = 36. 8 x 4 = 32 and 2 x 8 = 16 but there is not a number card for 32 or 2 .

Greater Depth

7b. A and C

8b. Various possible answers; for example: 60y, y + 1.475kg, 1,475g + y

9b. -16.6 is the odd one out because -18.3 + 12.9 = -5.4 and 3.7 + 12.9 = 16.6. -16.6 + 12.9 = -3.7 and -29.5 + 12.9 = -16.6 but there is not a number card for -3.7 or -29.5.

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Reasoning and Problem Solving – Find a Rule – One Step **ANSWERS**