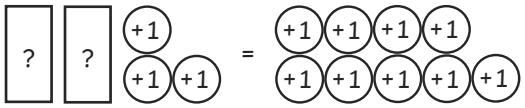
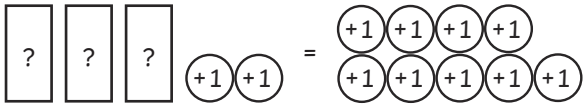
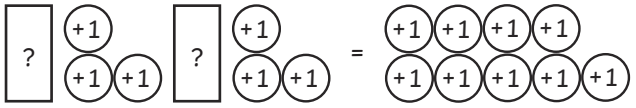
1) **a)** *The correct representation for $2x + 3 = 9$ is:*



The other representations show the following equations.



$3x + 2 = 9$



$2(x + 3) = 9$

2)

$x = 4$ **<** $y = 6$

$x = 5$ **=** $y = 5$

$x = 10$ **>** $y = 5$

3) Accept any three of these answers:

$x + 1 = 4$	$4 - x = 1$
$x + 5 = 8$	$8 - x = 5$
$x + 2 = 5$	$5 - x = 2$
$x - 1 = 2$	$x - 2 = 1$
$2x + 2 = 8$	$1- - 2x = 4$
$2x + 4 = 10$	$8 - 2x = 2$
$2(x + 1) = 8$	$2(x + 2) = 10$
$2(x - 1) = 4$	$4(x - 1) = 8$
$5(x - 1) = 10$	

1) *x = 6 in both equations.*

$3(x + 4) = 30$

$x + 4 = 30 \div 3$

$x + 4 = 10$

$x = 10 - 4$

$x = 6$

$3x + 4 = 22$

$3x = 22 - 4$

$3x = 18$

$x = 18 \div 3$

$x = 6$

2) a) *Nishi is incorrect as the right-hand side of the balance would show 4x = 16 and the expression she has written totals 17.*

b) *Accept any expressions totalling 16.*

3) a) *The '÷ 7' is correct as divide is the inverse of multiply. The '- 2' is incorrect as it should be the inverse, which is '+ 2'. This means x = 8 (6 + 2 = 8).*

b) *The missing inverse operations are '÷ by 8' and '- 3'. This then gives the correct answer that x = 9.*

1) By subtracting 4 from both sides of the equation, children should identify that the equation becomes $?x = 30$, therefore the value of x can be all the factors of 30:

$15x + 4 = 34$ where $x = 2$

$10x + 4 = 34$ where $x = 3$

$6x + 4 = 34$ where $x = 5$

$5x + 4 = 34$ where $x = 6$

$3x + 4 = 34$ where $x = 10$

$2x + 4 = 34$ where $x = 15$

2) The children should investigate substituting prime numbers in for the value of x and then reasoning what would need to be added to three times that number to make a square number.

For example: If $x = 11$, then $3x + 3 = 36$ or $3x + 16 = 49$

For example: If $x = 13$, then $3x + 10 = 49$ or $3x + 25 = 64$

3) Using the given lengths of pencil A and B, we can find the value of x:

$5x + 4 = 34\text{cm}$

$5x = 34 - 4$

$5x = 30\text{cm}$

$x = 30 \div 5$

$x = 6\text{cm}$

Now that we know the value of x, we can find the length of pencil D:

$4x + 25 = ?$

$(4 \times 6) + 25 = 49\text{cm}$

Now that we know the length of pencils A, B and D $(34 + 34 + 49 = 117)$, we can subtract these from the total length of 139cm to find the length of pencil C:

$139\text{cm} - 117\text{cm} = 22\text{cm}$

Pencil C is 22cm long.