Substituting Values Into Equations

When substituting values into equations, make sure to use the correct order of operations:

- brackets first
- multiply and divide in order from left to right
- add and subtract in order from left to right

Determine the value of y when substituting $x = 7$ into the following equation.

$y = 2(x - 3) + 5$

$y = 2(7 - 3) + 5$	Brackets
$y = 2(4) + 5$	Multiply
$y = 8 + 5$	Add
$y = 13$	

1. Determine the value of y in each equation when $d = 6$.

a) $y = (3d + 4) \div 2 + 8$

b) $y = 5 \times 4 + d \div 2$

c) $y = (3 + d - 7) \times 4d + 5$

2. Calculate the surface area of each rectangular prism using the formula $SA = 2(bh + bl + hl)$, where b = base, h = height, and l = length.

a) $b = 5$ cm, $h = 11$ cm, $l = 12$ cm

b) $b = 6$ cm, $h = 10$ cm, $l = 9$ cm

c) $b = 7$ cm, $h = 12$ cm, $l = 6$ cm

Modelling and Solving One-Step Equations

To solve a problem, you sometimes need to translate words into equations. For example, "the *sum* of 4 and another number is 12" can be modelled by the equation $4 + x = 12$.

The equation can now be solved.

$x + 4 = 12$	
$x + 4 - 4 = 12 - 4$	Subtract 4 from both sides of the equation.
$x = 8$	

3. Model each situation with an algebraic equation.

a) seven more than a number, p, is twelve

b) three less than a number, x, is eleven

c) four times a number, s, is twenty-eight

d) when a number, k, is divided by six, the result is nine

4. Develop and solve an algebraic equation for each question.

a) You share $20 equally among four people. How much does each person get?

b) If Jim's height increased by 13 cm over the past year and he is now 152 cm, how tall was he a year ago?

c) After Lynn triples the amount she has in her bank account, she has $54. How much did she initially have in her account?

d) Ayisha worked twice as long on a math project as Harpreet did. If Ayisha worked for 50 min on the project, how long did Harpreet work on it?

Solving Two-Step Equations

To solve a two-step problem of the form $ax + b = c$, you need to isolate the variable on one side of the equal sign. When undoing the operations performed on the variable, follow the reverse order of operations:

- Subtract and add in order from left to right.
- Multiply and divide in order from left to right.

Solve $6x + 7 = 25$.

$$6x + 7 = 25$$

$$6x + 7 - 7 = 25 - 7$$ Subtract 7 from both sides of the equation.

$$6x = 18$$

$$\frac{6x}{6} = \frac{18}{6}$$ Divide both sides of the equation by 6.

$$x = 3$$

Check:

Left Side $= 6x + 7$ Right Side $= 25$

$= 6(3) + 7$

$= 18 + 7$

$= 25$

Left Side = Right Side

The solution is correct.

5. Copy each equation. Circle the first operation you undo. Underline the second operation you undo.

a) $2n + 4 = 18$ **b)** $3x + 5 = 17$

c) $8y - 70 = 94$ **d)** $27 = 7q + 6$

6. Solve each equation. Check your solution.

a) $9 + 5j = 49$ **b)** $4t + 2 = 14$

c) $10x - 7 = 23$ **d)** $6p - 5 = 31$

7. Jan is sewing leather trim and ribbon on a new parka. The length of the leather trim is 40 cm more than 4 times the length of the ribbon. If Jan uses 240 cm of trim, how much ribbon does she use?