Linear equations with unknown (variable) numbers

Thinking exercise 1
Insert the exponent of each base number and solve the three equations in two steps:

Sum 1	Sum 2	Sum 3
$\square = 2 + 3$	$\square = 4 + 6$	$x = 12 + 8$

1. Why are you requested to fill in the exponents?
2. How does the last sum differ from the first two?
3. How did you arrive at the answer of S**um 3**?
4. Write down the rule you discovered.

Create your own sums as above and solve in two steps.

More than half of your examples should contain a variable (x). In all instances, insert the exponent of each base number.				

5. What did you do with x each time to solve the equation? Use the scale example to explain your point.
6. Write down the rule you discovered.

Thinking exercise 2: [The focus: When there is a positive number (e.g. +2) before or after x]

Solve	$3 + x = 5$
1. What mathematical calculation do you do with the sum (addition, subtraction, multiply or divide)? 2. Draw the equation in the form of a balanced scale. Use small blocks, for example $5 = 5\ small\ blocks$. 3. Because we do not know the value of x, draw x as a circle. 4. This means $3\ small\ blocks + a\ circle = 5\ small\ blocks$. 5. How will you determine the mass of the circle (in terms of blocks) by moving around blocks to ensure that the scale is still in balance? 6. Change the circle back to x and write the answer as an algebraic equation. 7. Insert the exponent of each base number. 8. What is this type of equation called? Motivate.	

Thinking exercise 3: [The focus: When there is a negative number attached (e.g. –2) before or after x]

Solve	$x - 3 = 5$
1. What mathematical calculation do you do with the sum (addition, subtraction, multiply or divide)? 2. Draw an equation in the form of a balanced scale. Use blocks, for example $5 = 5\ blocks$. 3. Because we do not know the value of x, draw x as a circle.	

4. This means a circle – $3\ blocks\ =\ 5\ blocks$. 5. Because it is not possible to place –3 blocks on the scale, how will you get the –3 to '**disappear**'? Hint: What is $+3\ -3$? 6. What is going to happen with the scale if you add 3 blocks on the left-hand side? 7. Change the circle back to x and write the answer as an algebraic equation. 8. Insert the exponent of each base number. 9. What is this type of equation called? Motivate.	

Thinking exercise 4 [The focus: When there is a number fixed to x (e.g. 2) before or after x]

Solve	$2x = 6$
1. What mathematical calculation do you do with the sum (addition, subtraction, multiply or divide)? 2. Draw an equation in the form of a balanced scale. Use blocks, for example 5 = 5 blocks. 3. Because we do not know the value of $2x$, draw x as a circle, i.e. two identical circles. 4. This means 2 circles = 6 blocks. How many blocks are equal to one circle? 5. Change the circles back to x and write the answer as al algebraic equation. 6. Insert the exponent of each base number and write the answer as an algebraic equation. 7. What is this type of equation called? Motivate	

Create your own sums and solve:

Thinking exercise 9

1. Do similar sums from your textbook to prove that you have fully mastered the work.
2. Use lines and arrows and number the steps you followed to demonstrate how you did the sum.
3. Which questions should you ask yourself to ensure that each sum you do is correct? If you were to mark another learner's work, on what would you focus to determine if the sum was correctly done or not?
4. Which sums in your textbook are more difficult? What makes these sums more difficult? How did you cleverly/creatively go about mastering the more difficult ones?
5. Do sums from test and exam papers. What makes these sums more difficult? How did you cleverly/creatively go about mastering the more difficult ones?
6. Formulate a strategy that you can use to empower another learner to master the method as well.