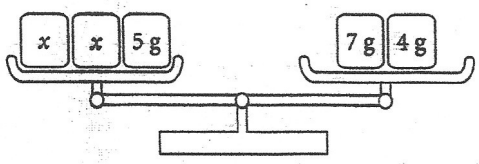
6.2 Using a Model to Solve Equations

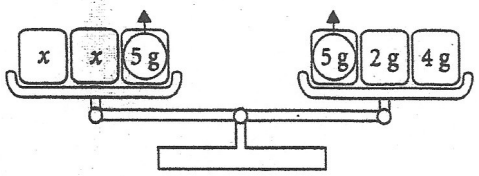
Quick Review

At Home
At School

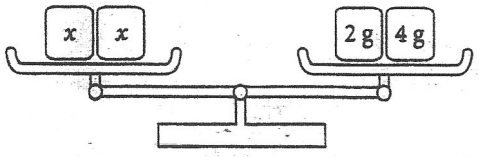
Balance scales can be used to model an equation.
When the pans are balanced, the masses on both pans are equal.
This two-pan balance models the equation $2x + 5 = 7 + 4$.



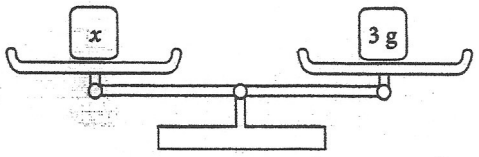
To find each unknown mass, x, replace the 7 g in the right pan with 5 g and 2 g.
Then remove 5 g from each pan.



The unknown masses have been isolated in the left pan, and 6 g is left in the right pan.



The two unknown masses balance 6 g.
So, each unknown mass is 3 g.

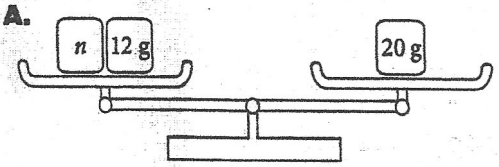


The solution to the equation is $x = 3$.
You can verify the solution by replacing each unknown mass in the original balance scales with 3 g.
Then, in the left pan: 3 g + 3 g + 5 g = 11 g
And, in the right pan: 7 g + 4 g = 11 g
Since the masses are equal, the solution is correct.

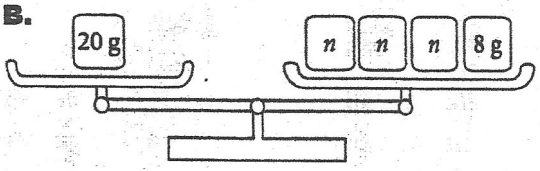
Practice

1. Match each balance scales with an equation below.

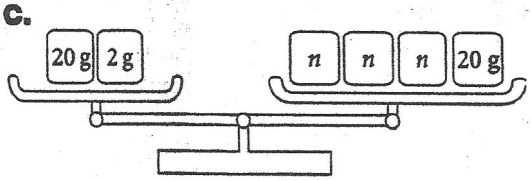
A.



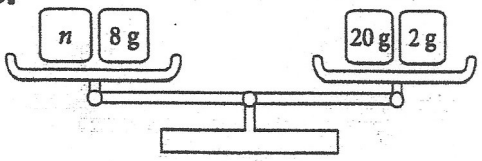
B.



C.



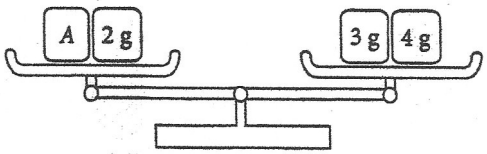
D.



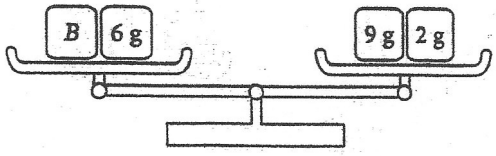
i) $n + 8 = 22$ ___ ii) $3n + 8 = 20$ ___ iii) $3n + 20 = 22$ ___ iv) $n + 12 = 20$ ___

2. Write the equation modelled by each two-pan balance. Then solve the equation.

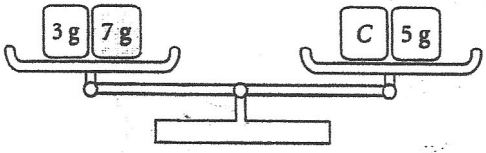
a)



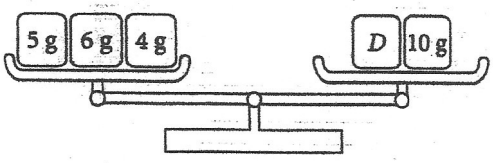
b)



c)

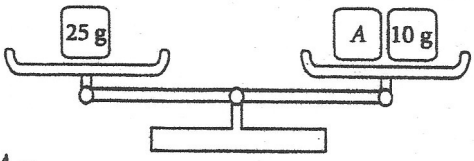


d)



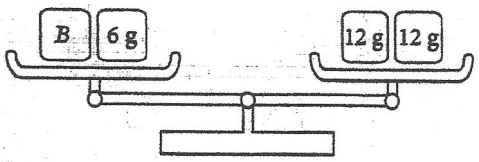
3. Find the value of the unknown mass on each balance scales.

a)



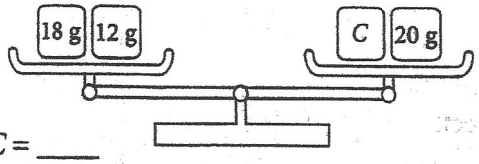
$A =$ ___

b)



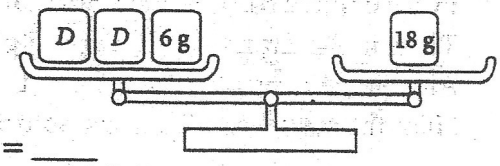
$B =$ ___

c)



$C =$ ___

d)



$D =$ ___

4. a) Sketch balance scales to represent each equation.
b) Solve each equation. Verify the solution.

i) $x + 7 = 12$

$x =$ ____

ii) $n + 18 = 22$

$n =$ ____

iii) $2m = 26$

$m =$ ____

iv) $27 = 9 + 3k$

$k =$ ____

5. a) Write an equation for each sentence.
b) Solve each equation. Verify the solution.

i) Two more than a number is 12.

_____

ii) A number increased by nine is 21.

_____

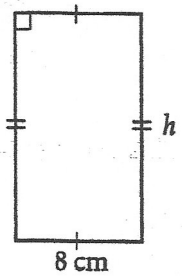
iii) Four times a number is 24.

_____

iv) Four more than three times a number is 28.

_____

6. The perimeter of this rectangle is 44 cm and the base is 8 cm.
What is the height, h?



a) Write an equation to represent this problem.

_____

b) Model the equation with balance scales.

c) Solve the equation for h to find the height. _____

7. The area of a rectangle is given by the formula $A = bh$,
where b is the base of the rectangle and h is the height.
The area of a rectangle is 120 cm^2, and its base is 15 cm.
What is the height of the rectangle? _____