Simultaneous Equations 2

Exercise A

1. $2x + y = 5$
   $x + 3y = 5$
2. $x + 2y = 8$
   $2x + 3y = 14$
3. $3x + y = 10$
   $x - y = 2$
4. $2x + y = -3$
   $x - y = 2$
5. $4x + y = 14$
   $x + 5y = 13$
6. $x + 2y = 1$
   $2x + 3y = 4$
7. $2x + y = 5$
   $3x - 2y = 4$
8. $2x + y = 13$
   $5x - 4y = 13$
9. $7x + 2y = 19$
   $x - y = 4$
10. $b - a = -5$
    $a + b = -1$
11. $a + 4b = 6$
    $8b - a = -3$
12. $a + b = 4$
    $2a + b = 5$
13. $3m = 2n - 6\frac{1}{2}$
    $4m + n = 6$
14. $2w + 3x - 13 = 0$
    $x + 5w - 13 = 0$
15. $x + 2(y - 6) = 0$
    $3x + 4y = 30$
16. $2x = 4 + z$
    $6x - 5z = 18$
17. $3m - n = 5$
    $2m + 5n = 7$
18. $5c - d - 11 = 0$
    $4d + 3c = -5$

Exercise B

1. $2x + 5y = 24$
   $4x + 3y = 20$
2. $5x + 2y = 13$
   $2x + 6y = 26$
3. $3x + y = 11$
   $9x + 2y = 28$
4. $x + 2y = 17$
   $8x + 3y = 45$
5. $3x + 2y = 19$
   $x + 8y = 21$
6. $2a + 3b = 9$
   $4a + b = 13$
7. $2x + 7y = 17$
   $5x + 3y = -1$
8. $5x + 3y = 23$
   $2x + 4y = 12$
9. $3x + 2y = 11$
   $2x - y = -3$
10. $3x + 2y = 7$
    $2x - 3y = -4$
11. $x - 2y = -4$
    $3x + y = 9$
12. $5x - 7y = 27$
    $3x - 4y = 16$
13. $x + 3y - 7 = 0$
    $2y - x - 3 = 0$
14. $3a - b = 9$
    $2a + 2b = 14$
15. $2x - y = 5$
    $\frac{x}{4} + \frac{y}{3} = 2$
16. $3x - y = 17$
    $\frac{x}{5} + \frac{y}{2} = 0$
17. $4x - 0{\cdot}5y = 12{\cdot}5$
    $3x + 0{\cdot}8y = 8{\cdot}2$
18. $0{\cdot}4x + 3y = 2{\cdot}6$
    $x - 2y = 4{\cdot}6$

Exercise C

1. Find two numbers with a sum of 15 and a difference of 4.
2. Twice one number added to three times another gives 21. Find the numbers, if the difference between them is 3.
3. The average of two numbers is 7, and three times the difference between them is 18. Find the numbers.

4. Here is a puzzle from a newspaper. The ? and * stand for numbers which are to be found. The totals for the rows and columns are given.
Write down two equations involving ? and * and solve them to find the values of ? and *

?	*	?	*	36
?	*	*	?	36
*	?	*	*	33
?	*	?	*	36
39	33	36	33	

5. The line, with equation $y + ax = c$, passes through the points (1, 5) and (3, 1). Find a and c.
Hint: For the point (1, 5) put $x = 1$ and $y = 5$ into $y + ax = c$, etc.

6. The line $y = mx + c$ passes through (2, 5) and (4, 13). Find m and c.

7. A stone is thrown into the air and its height, h metres above the ground, is given by the equation

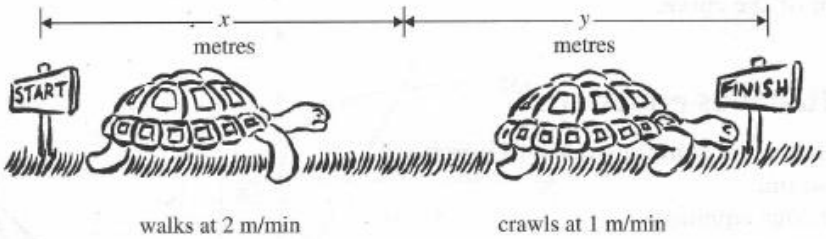
$h = at - bt^2$.

From an experiment we know that $h = 40$ when $t = 2$ and that $h = 45$ when $t = 3$.
Show that, $a - 2b = 20$
and $a - 3b = 15$.
Solve these equations to find a and b.

8. A television addict can buy either two televisions and three video-recorders for £1750 or four televisions and one video-recorder for £1250. Find the cost of one of each.

9. A pigeon can lay either white or brown eggs. Three white eggs and two brown eggs weigh 13 ounces, while five white eggs and four brown eggs weigh 24 ounces. Find the weight of a brown egg, b, and of a white egg, w.

10. A tortoise makes a journey in two parts; it can either walk at 2 m/min or crawl at 1 m/min.



If the tortoise walks the first part and crawls the second, the journey takes 110 minutes.
If it crawls the first part and walks the second, the journey takes 100 minutes.

Let x metres be the length of the first part and y metres be the length of the second part.
Write down two simultaneous equations and solve them to find the lengths of the two parts of the journey.
[Use the formula, Time = Distance ÷ Speed]

11. A cyclist completes a journey of 500 m in 22 seconds, part of the way at 10 m/s and the remainder at 50 m/s. How far does she travel at each speed?

12. A bag contains forty coins, all of them either 2p or 5p coins. If the value of the money in the bag is £1·55, find the number of each kind.

13. A slot machine takes only 10p and 50p coins and contains a total of twenty-one coins altogether. If the value of the coins is £4·90, find the number of coins of each value.

14. Thirty tickets were sold for a concert, some at 60p and the rest at £1. If the total raised was £22, how many had the cheaper tickets?

15. A kipper can swim at 14 m/s with the current and at 6 m/s against it. Find the speed of the current and the speed of the kipper in still water.

16. If the numerator and denominator of a fraction are both decreased by one the fraction becomes $\frac{2}{3}$. If the numerator and denominator are both increased by one the fraction becomes $\frac{3}{4}$. Find the original fraction.

17. In three years' time a pet mouse will be as old as his owner was four years ago. Their present ages total 13 years. Find the age of each now.

18. The curve $y = ax^2 + bx + c$ passes through the points (1, 8), (0, 5) and (3, 20). Find the values of a, b and c and hence the equation of the curve.

19. The curve $y = ax^2 + bx + c$ passes through (1, 8), (−1, 2) and (2, 14). Find the equation of the curve.