Worksheet 17: Algebra part 4

Simultaneous equations, and graphical solution methods

Gateway skills (revision)

- Rearranging formulas

- Making formulas from words

- Negative numbers and BIDMAS

- Solving linear equations

Questions

1) Work out –3 – 7

2) Work out –5 × –7

3) Rearrange $I = \dfrac{V}{R}$ to make V the subject of the formula

4) Work out $\dfrac{4 \times 3 + 8}{5}$

5) Florence sells cabbages for 50 pence each
   Write an expression for the cost of f cabbages.

6) Ahmad sells n lemons at 3 dirham each
   Write an expression for the total cost in dirham of the n lemons

7) A = 3P + 5Q
   Work out the value of A when P = 9 and Q = 7

8) Z = 3W – 4Y
   Work out the value of Z when W = 5 and Y = –6

9) Solve $4x + 5 = 13$

10) Solve $3y + 7 = 1$

11) Find two integers that add to 10 and multiply to give 21

12) Simplify 4x – –3x + 5y – y

Solve simultaneous equations in two unknowns

1) Solve the simultaneous equations below

$x + y = 15$
$3x + y = 27$

2) Solve the simultaneous equations below

$2p - q = \ 4$
$5p + q = 17$

3) Solve the simultaneous equations below

$x + y = 8$
$x - y = 2$

4) Solve the simultaneous equations below

$x \ + 3y = 14$
$2x + \ y = 13$

5) Solve the simultaneous equations below

$4x + 3y = 17$
$2x - 3y = 13$

6) Solve this pair of simultaneous equations

$9x + 4y = 22$
$3x + 2y = 14$

7) Solve this pair of simultaneous equations

$4x - 2y = 2$
$3x + 3y = 24$

Setting up and solving simultaneous equations

You can use common sense to solve some of these, but try setting up the algebra as well

1) Tom is four years older than Charlie

   The total of their ages is 18

   Find the age of each of the boys

2) Three cabbages and a cauliflower cost a total of £3.00

   A cabbage and a cauliflower cost a total of £1.60

   Find the cost of a cabbage and the cost of a cauliflower

   Hint: work in pence to avoid decimals

3) Six lemons and four limes cost a total of £3.80

   Two lemons and a lime cost £1.10

   a) Find the cost of a lemon

   b) Find the cost of a lime

4) The office staff go out for pizza on Fridays.

   Last Friday they bought 6 margarita pizzas and one pesto pizza for a total of £15.00

   This Friday they buy 2 margarita pizzas and 5 pesto pizzas for £19.00

   Use simultaneous equations to work out the cost of a margarita pizza and the cost of a pesto pizza

5) **Challenge**: Algernon buys two bananas and four mangos for £3.80

   He buys one banana and two mangos for £1.90

   Algernon says he has enough information to work out the price of a banana. Is he right?

   You must give a reason
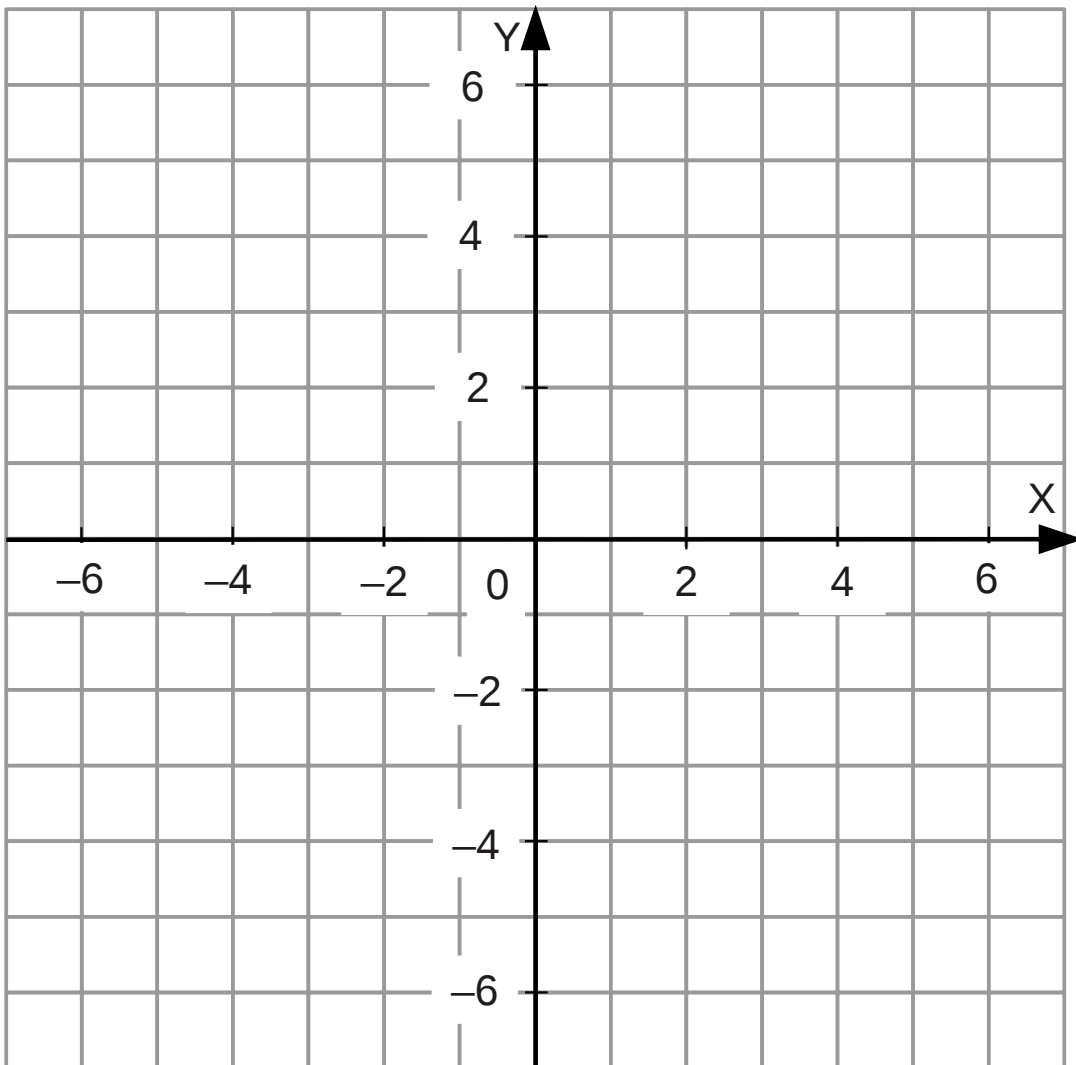
Graphical solution of simultaneous equations

Use the grid below to plot the graphs of

$$4x - y = 3$$

and

$$-2x + 3y = 6$$

and hence solve this pair of simultaneous equations

Challenge: use an algebraic solution to check the result.