Simultaneous Equations 2

1. Solve the following pairs of equations

(a) $2a + 3c = 9$
$3a + c = 10$

(b) $3m - 2n = 16$
$2m + 3n = 15$

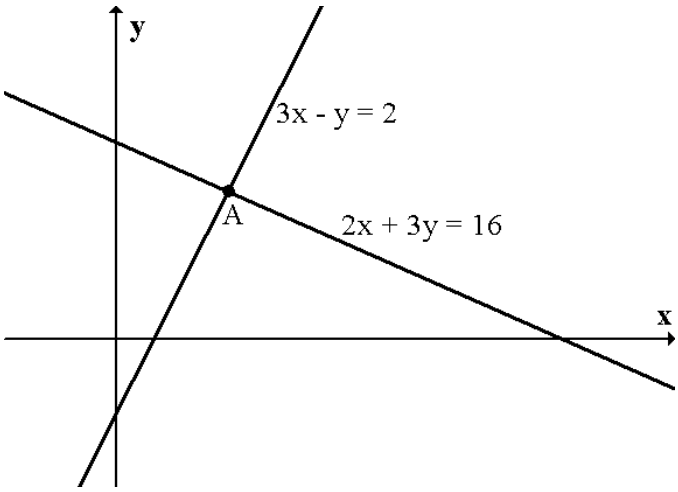
(c) $2p - 4q = -30$
$5p - 3q = -5$

(d) $4x + 2y = -10$
$3x - 5y = -1$

2. The diagram opposite shows the lines

$3x - y = 2$ and $2x + 3y = 16$

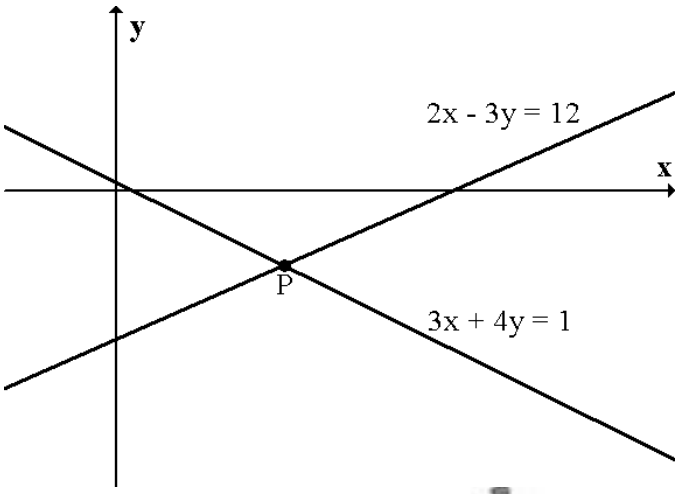
Find the coordinates of A, the point of intersection of these lines.



3. The diagram opposite shows the lines

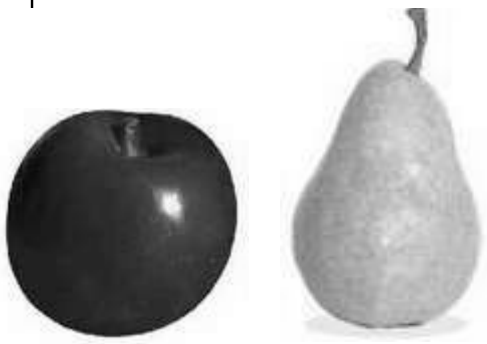
$2x - 3y = 12$ and $3x + 4y = 1$

Find the coordinates of P, the point of intersection of these lines.



4. 2 apples and 5 pears cost 90 pence.
3 apples and a pear cost 57 pence.

Find the cost of an apple and of a pear.



5. 6 pens and 4 pencils cost £1.08.
4 pens and 3 pencils cost 75 pence.

Find the cost of 5 pens and 5 pencils.

6. (a) The diagram below shows some squares and some parallelograms.
The total area of all the shapes is 64 cm^2.

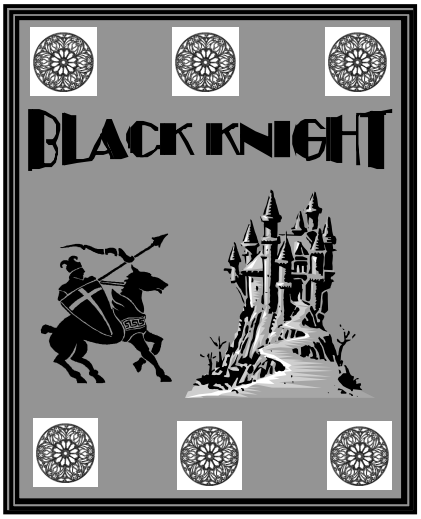
Using **x** to represent the area of a square and **y** to represent the area of a parallelogram, write down an equation involving x and y.

(b) Some more squares and parallelograms are shown below.
The total area of these shapes is 46 cm^2.

Write down another equation involving x and y.

(c) Use you equations to find the total area of

7. (a) Mr. and Mrs. Alba take their 3 children to see the film Black Knight.
The tickets cost a different amount for adults and children.
Altogether they pay £25.50 for their tickets.



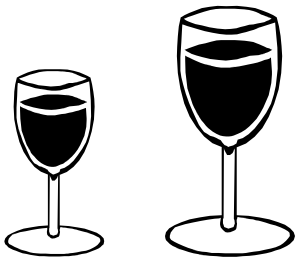
Using **x** to represent an adult ticket and **y** to represent a child ticket, write down an equation involving x and y.

(b) Mr. McMahon and his son also go to see the Black Knight. They pay £10.50 for their tickets.

Write down another equation involving x and y.

(c) Mr. and Mrs. Chicklis take their 5 children to see the same film. How much will it cost them for their tickets?

8. Wine glasses come in two sizes – small and large.



(a) Two small glasses and three large glasses can hold 1litre of wine.
Write down an equation for this.

(b) Three small glasses and five large glasses can hold 1625 ml of wine.
Write down an equation for this.

(c) Find how much a small wine glass can hold.

9. (a) A group of teachers and pupils go to a concert.
There are 20 people in the group altogether.

Let **x** represent the number of teachers in the group
and **y** the number of pupils.
Write down an equation involving x and y.

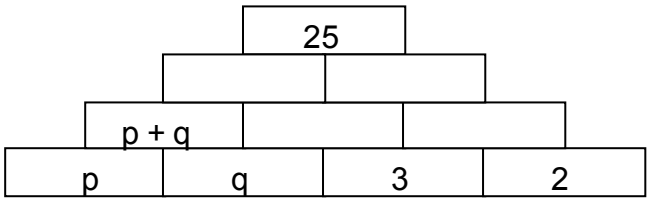
(b) Tickets for the concert cost £8 for teachers and £3 for pupils. The total cost of the tickets is £80.
Write down another equation in x and y.

(c) Use your equations to find the number of teachers and the number of pupils in the group.

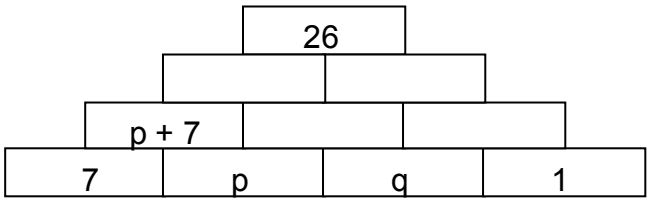
10. In the diagram opposite each rectangle is the sum of the rectangles below it.

(a) Show that, for this diagram,

$$p + 3q = 14$$



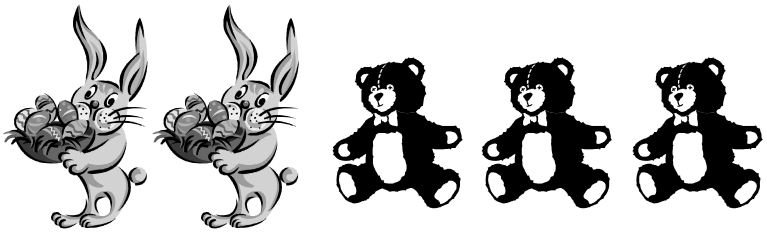
(b) Find a similar expression for the diagram opposite.



(c) Find the values of p and q.

11. A toy shop sells teddy bears and rabbits.

(a) To buy the following it would cost £84. Write down an equation for this.



(b) The following would cost £76. Write down an equation for this.

(c) Find the cost of a rabbit and of a teddy bear.

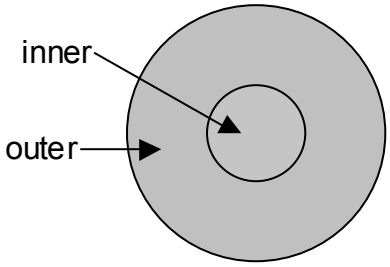
12. A drama club is organising a dance to celebrate a successful theatre production.
    (a) Tickets for the dance cost £2 for members and £5 for non-members.
    Altogether the club take in £230 from ticket sales.

    Let **x** represent the number of members attending the dance and **y** represent the number of non-members.
    Write down an equation involving x and y.

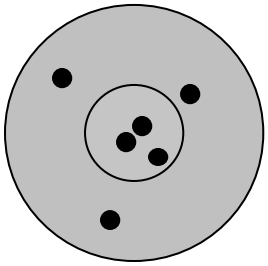
    (b) Given that 70 people attend the dance, write down another equation in x and y.

    (c) How many members attended the dance?

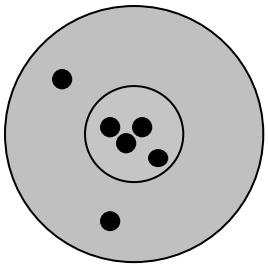
13. A game involves throwing darts at a circular target divided into outer and inner rings, as shown opposite.
    The inner and outer rings score a different number of points.
    Laura and Tommy each throw 6 darts.



    (a) The diagram opposite shows where Laura's darts land on the target. Laura scores 105 points.
    Let **x** represent a dart in the outer ring and **y** a dart in the inner ring.
    Write down an equation involving x and y.



    (b) The diagram opposite shows where Tommy's darts land.
    Tommy scores 120 points.
    Write down another equation in x and y.



    (c) How many points is a dart in the inner ring worth?

14. The cost of hiring a car depends on the number of days the car is hired and the number of litres of petrol used.

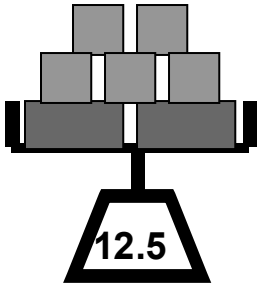
    (a) Debbie hired a car for 3 days and used 40 litres of petrol.
    The total cost of the hire was £113.
    Write down an equation to represent this.

    (b) Umair hired a car for 2 days and used 30 litres of petrol.
    The total cost for Umair was £78.50.
    Write down an equation to represent this.

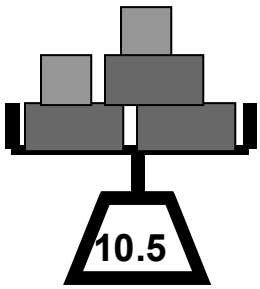
    (c) Asma hired a car for 5 days and used 80 litres of petrol.
    How much would Asma pay in total.

15.(a) The diagram opposite shows a large set of scales used for weighing parcels.
The parcels come in two different sizes – large and small.
2 large and 5 small parcels weigh 12.5 kg.

Write down an equation to represent this.



(b) The scales opposite show that 3 large and 2 small parcels weigh 10.5 kg.
Write down an equation to represent this.



(c) Find the weight of a large parcel and of a small parcel.

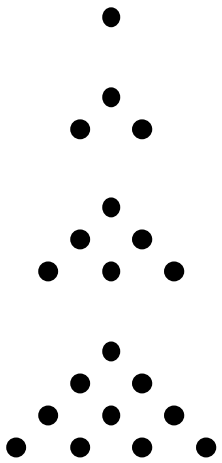
16. The triangular numbers, 1, 3, 6 ,10, …….can be represented in the following way

1st triangular number: **n = 1, D = 1**

2nd triangular number: **n = 2, D = 3**

3rd triangular number: **n = 3, D = 6**

4th triangular number: **n = 4, D = 10**



These triangular numbers satisfy the formula **D** = a$\mathbf{n^2}$ + b**n**

(a) Use the information above to construct two equations in **D** and **n.**
(b) Use your equations to find the values of a and b.
(c) Calculate the 15th triangular number (i.e. when n = 15)

17. A petrol station sells two types of fuel – unleaded and diesel.

(a) Unleaded petrol costs 90 pence per litre and diesel costs 95 pence per litre. One particular week the petrol station sells £36 500 worth of fuel.
Using **x** to represent a litre of unleaded fuel and **y** to represent a litre of diesel, write down an equation involving x and y.

(b) In that week the petrol station sold a total of 40 000 litres of fuel.
Write down another equation in x and y.

(c) Calculate how many litres of unleaded fuel were sold that week.