

## CHAPTER 3

- 1)  $x = 1, y = 3$       2)  $x = -3, y = 1$       3)  $x = 0, y = -2$       4)  $x = 3, y = 1$   
 5)  $a = 7, b = -2$       6)  $p = 11/3, q = 4/3$

### CHALLENGE QUESTIONS:

#### Question 1

77 cherries

Suppose that Karen has  $x$  cherries. Then Lionel has  $\frac{1}{3}x$  cherries and Michael has  $\frac{1}{2}x$  cherries. Michael has seven more cherries than Lionel and so  $\frac{1}{2}x - \frac{1}{3}x = 7$ . Therefore  $(\frac{1}{2} - \frac{1}{3})x = 7$ , that is,  $(\frac{3-2}{6})x = 7$ , and hence  $\frac{1}{6}x = 7$ . Therefore  $x = 42$ . It follows that Karen has 42 cherries, Lionel has 14 cherries and Michael has 21 cherries. So they have  $42 + 14 + 21 = 77$  cherries between them.

#### Question 2

2010

Let the two numbers be  $a$  and  $b$ , where  $a > b$ . Then we have  $a + b = 97$  and  $a - b = 37$ . Hence  $2a = 134$  and therefore  $a = 67$  and  $b = 30$ . The product of 67 and 30 is 2010.

#### Question 3

length = 15 cm and width = 9 cm

15

9

6

**B5** for  $[x=] 4.5$  or  $4\frac{1}{2}$  and  $[y=] -0.5$  or  $-\frac{1}{2}$  even given as answers

OR

**B2** for  $5x - y - 8 = 3x + 5y + 4$  or  $3x + y - 4 = 2x - 6y - 3$

and

**M1dep** for rearranging either equation correctly so that the  $x$ 's,  $y$ 's and numbers are combined in one of the equations

and

**M1dep** for multiplying one equation to equate coefficients of one variable and

**M1dep** for the correct method to eliminate a variable

If 0 scored **SC1** for equating two adjacent sides e.g.  $5x - y - 8 = 2x - 6y - 3$

accept 15 or 9 either way round for 6 marks

The next **M1s** are dep on **B2** gained. For **M1** need an equation with one  $x$  term, one  $y$  term and one number term and allow one numerical error e.g.  $2x - 6y = 12$  oe or  $x + 7y = 1$  oe .

allow one numerical error e.g.  $2x - 6y = 12$  and  $2x + 14y = 2$

allow one numerical error e.g.  $20y = -10$

#### Question 4

15 frogs

Let the number of Brachycephalus frogs and common frogs in the bucket be  $b$  and  $c$  respectively. Note that each Brachycephalus frog has 6 toes and 4 fingers, while a common frog has 10 toes and 8 fingers.

Therefore,  $6b + 10c = 122$  (1);  $4b + 8c = 92$  (2). Subtracting (2) from (1) gives  $2b + 2c = 30$ , so  $b + c = 15$ .

#### Question 5

$L = 7$

Adding the top row and the middle column gives,

$2J + K + 2K + J = 5 + 7 = 12$ . Hence  $3J + 3K = 12$ . So  $J + K = 4$ .

The first column shows that  $J + K + L = 11$ .

Hence,  $J + K + L - (J + K) = 11 - 4 = 7$ . Therefore  $L = 7$ .

(It is then possible to deduce that  $J = 1$  and  $K = 3$  and check that each total is correct.)

$J$	$K$	$J$	5
$K$	$K$	$L$	13
$L$	$J$	$L$	15
11	7	15	