

GCSE – Mathematics only

Topic: Simultaneous equations

Tier: Intermediate

Grade:

B



**Starter:**

1. Solve  $5a + 6 = 31$

2. Solve  $8 + 2a = 20$

3. Solve  $4a - 2 = 17$

4. Solve  $10 - 2a = 5$

**Skills:**

1. Solve  $4a + 2b = 10$   
 $a + 2b = 7$

2. Solve  $9a - 4b = 59$   
 $2a - b = 12$

3. Solve  $3a + 3b = -6$   
 $4a - 4b = -24$

**Top Tips!**

- Make sure you get the coefficients (number before the letter) the same in both equations if using the **elimination** method

E.g. Solve  $3a + 2b = 23$  (1)  
 $2a - b = 6$  (2)

Label the equations (1) and (2)

To get the coefficient of b the same we must multiply equation (2) by 2 and leave equation (1) as it is.

(You could get the coefficient of a the same instead if you prefer)

So  $3a + 2b = 23$   
 $4a - 2b = 12$

We add the equations together to get:

$$7a = 35$$
$$a = 5$$

We substitute  $a = 5$  into equation (1)

$$3 \times 5 + 2b = 23$$

Solve this equation to get  $b = 4$

Solution is  $a = 5, b = 4$

**Examination Question:**

**2015 Summer Link Applications U2 Higher Q8a**

An organic fruit farm sells cherries and raspberries.

Poppy buys 3kg of cherries and 5kg of raspberries.

Harry buys 4kg of cherries and 7kg of raspberries.

Poppy spends £66.10 and Harry spends £91.

Use an algebraic method to calculate the total cost of 10kg of cherries and 1kg of raspberries.

You must show your working.[6]

Assessment for Learning

Video / QR code

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**Starter:**

1. Solve  $5a + 6 = 31$   
 $a = 5$
2. Solve  $8 + 2a = 20$   
 $a = 6$
3. Solve  $4a - 2 = 17$   
 $a = 19/4$  (or 4.75)
4. Solve  $10 - 2a = 5$   
 $a = 5/2$  (or 2.5)

**Skills:**

1. Solve  $4a + 2b = 10$   
 $a + 2b = 7$   
 $a = 1, b = 3$
  
2. Solve  $9a - 4b = 59$   
 $2a - b = 12$   
 $a = 11, b = 10$
  
3. Solve  $3a + 3b = -6$   
 $4a - 4b = -24$   
 $a = -4, b = 2$

**Top Tips!**

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Set up the equations, defining variables.

$c$  represents the cost of a kg of cherries,  $r$  represents the cost of a kg of raspberries

$$3c + 5r = 66.10 \quad (1)$$

$$4c + 7r = 91 \quad (2)$$

Equation (1)  $\times 7$ , Equation (2)  $\times 5$

$$21c + 35r = 462.70$$

$$20c + 35r = 455$$

Subtract

$$c = 7.70$$

Substitute  $c = 7.70$  into equation (1) and solve remaining equation

$$c = 7.70, r = 8.60$$

So 10 kg of cherries = £77 and 1 kg of raspberries = £8.60

Total cost = £77 + £8.60 = £85.60

Assessment for Learning

Video / QR code

