

Starter

1) Solve the simultaneous equations.

$$2x - 3y = 6$$

$$2x + 5y = 22$$

Elimination by Scaling One Equation

Today we are learning...

How to solve simultaneous equations using elimination requiring us to scale one equation first.

I will know if I have been successful if...

I can spot which equation to multiply.

I can spot whether to add or subtract equations.

I can solve to find x and y.



Example 1

How might you solve these simultaneous equations?

Why does elimination not (currently) work?

$$3x + 2y = 13$$

$$x - y = 3.5$$

$$x = 4$$

$$y = 0.5$$

Answer

Example 2

Solve Simultaneously

$$2x + 3y = 9$$

$$x + 4y = 7$$

$$x = 3$$

$$y = 1$$

Answer

Practice

Solve the following pairs of simultaneous equations:

(a) $2x + 4y = 24$
 $7x - 2y = 4$

(b) $4a - 3b = 18$
 $2a + 6b = -6$

(c) $2e + 7f = 26$
 $8e - 5f = 38$

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

(e) $2x - 3y = 10$
 $3x - 6y = 18$

(f) $4p + 3q = 1$
 $8p + 5q = -1$

(g) $2g + 3h = 1$
 $5g - 2h = -26$

(h) $-2x + 3y = 6$
 $9x - 7y = -1$

(i) $2u + 4v = -16$
 $11u - 7v = -1$

(j) $2x - 8y = 0$
 $5x - 5y = 15$

(k) $3p + 2q = -11$
 $4p + 3q = -14$

(l) $10a - 3b = 46$
 $6a - 8b = 40$

National 5 Booklet

Page 15 Question 3

Parts A-F

A) $x = 2$
 $y = 5$

B) $a = 3$
 $b = -2$

C) $e = 6$
 $f = -2$

D) $x = -1$
 $y = 3$

E) $x = 2$
 $y = -2$

F) $p = -2$
 $q = 3$

Exam Question

At the funfair coloured tokens are awarded as prizes in some of the games. These tokens can be saved up and exchanged for larger items.

3 green tokens and 4 red tokens have a total value of 26 points.

5 green tokens and 2 red tokens have a total value of 20 points.

Dave has 10 green tokens and 10 red tokens.

Does he have enough points to exchange for a large soft toy with a points value of 75?



Starter

1) Solve the simultaneous equations

$$5x + 2y = 8$$

$$2x - y = -5$$

2) Without doing any working. Why do these two simultaneous equations have no solution?

$$y = 3x - 2 \quad \text{and} \quad y - 3x = 6$$

Elimination by Scaling Two Equations

Today we are learning...

How to solve simultaneous equations using elimination requiring us to scale two equations.

I will know if I have been successful if...

I can spot what to multiply each equation by.

I can spot whether to add or subtract equations.

I can solve to find both x and y.



Elimination by Scaling Two Equations

Solve Simultaneously

$$x = 5$$

$$3x + 4y = 23$$

$$y = 2$$

$$2x + 5y = 20$$

Answer

Elimination by Scaling Two Equations

$$x = -1$$

$$y = 2$$

Answer

Solve Simultaneously

$$3x + 4y = 5$$

$$-2x + 5y = 12$$

Practice

Solve the following pairs of simultaneous equations:

(a) $5x + 2y = 9$
 $2x - 3y = -4$

(b) $4x + 5y = 7$
 $7x - 3y = 24$

(c) $5x + 2y = 14$
 $4x - 5y = -2$

(d) $3x + y = 16$
 $2x + 3y = 13$

(e) $8x - 3y = 19$
 $3x - 2y = 1$

(f) $5x + 3y = 19$
 $7x - 4y = 43$

(g) $2x - 5y = 21$
 $3x + 2y = 3$

(h) $2x - 3y = 17$
 $7x - 4y = 40$

(i) $8x + 2y = 23$
 $5x + 6y = 31$

(j) $2x + 3y = 7$
 $4x + 5y = 12$

(k) $7x + 2y = 11$
 $6x - 5y = -4$

(l) $7x - 5y = 35$
 $9x - 4y = 45$

Answers

A) $x = 1$
 $y = 2$

B) $x = 3$
 $y = -1$

C) $x = 2$
 $y = 2$

D) $x = 5$
 $y = 1$

E) $x = 5$
 $y = 7$

F) $x = 5$
 $y = -2$

Summary

2013 Specimen P1, Q10

3. Brian and Bob visit a ski resort. Brian buys 3 full time passes and 4 restricted passes. The total cost of his passes is £185.

(a) Write down an equation to illustrate this information. (1 mark)

(b) Bob buys 2 full passes and 3 restricted passes.

The total cost of his passes is £130.

Write down an equation to illustrate this information. (1 mark)

(c) Find the cost of a restricted pass and the cost of a full pass. (3 marks)

Exam Style Questions

Today we are learning...

How to answer simultaneous equations exam style questions.

I will know if I have been successful if...

I can create equations from worded problems.

I can use a range of strategies to solve simultaneous equations.

I can check my answer.



Solving Simultaneous Equations

1) Graphically

Plot the straight lines and see where they meet. Not accurate and takes a lot of time.

2) Substitution

Effective when we have equations that equal the same thing.

3) Elimination.

The most effective technique. May need to scale one or both equations.

Exam Questions

Question 1 - Creating Equations

Starter

1) What should I scale these equations by to eliminate a variable?

$$7d + 12s = 168$$

$$4d + 9s = 111$$

2) Should I add or subtract the equations?

3) What is the value of d and s ?

When working on question 4, this will help!