

Simultaneous equations algebraically

About 55 minutes Calculator allowed 53 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/gcse-simultaneous-equations-algebraically/

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

A1 Needed today [2 marks] **A2** From chapter 13 [2 marks]

Solve $2(x + 2) - 7(x - 3) = -15$.

Answer

A spinner lands on yellow, blue or white. $P(\text{yellow}) = 0.3$ and $P(\text{blue}) = 0.3$. It is spun 60 times. Estimate how many times it lands on white.

Answer

A3 Key Stage 3 [2 marks] **A4** Key Stage 3 [2 marks]

A number x is truncated to a whole number. The result is 625. Write down the error interval for x .

Answer

Work out $(-3)^2 - 4 \times (-7)$.

Answer

B Examples, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Solve the simultaneous equations
 $3x + y = 17$ and $5x - y = 15$.

Hint The y terms have opposite signs, so add the equations.

B1 [3 marks]

Solve the simultaneous equations $4x + 3y = 25$ and $4x - 2y = 10$.

Answer

EXAMPLE 2

Solve the simultaneous equations $y = 3x - 2$ and $5x - y = 8$.

Hint Put $3x - 2$ in place of y , in a bracket.

B2 [3 marks]

Solve the simultaneous equations $y = 3 - 2x$ and $3x + 2y = 4$.

Answer

EXAMPLE 3

Solve the simultaneous equations
 $2x + 5y = 1$ and $x + 3y = 0$.

Hint Multiply the second equation by 2 so both have $2x$.

B3 Solve the simultaneous equations $5x + 3y = 11$ and $3x - 2y = 18$. You must show your working. [4 marks]

Answer

c Practice

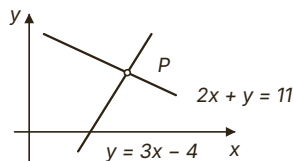
C1 Solve the simultaneous equations $3x = 2y + 7$ and $4y = 5x - 13$. [3 marks]

Answer

C2 Solve the simultaneous equations $0.5x + 0.2y = 3.1$ and $0.3x - 0.2y = 1.7$. [3 marks]

Answer

C3 The lines $y = 3x - 4$ and $2x + y = 11$ meet at P . Find the coordinates of P . [3 marks]



Not drawn accurately

C4 Solve the simultaneous equations $\frac{x}{2} + \frac{y}{3} = 4$ and $x - y = 3$. [3 marks]

Answer

Answer

C5 The n th term of a sequence is $an + b$. The 4th term is 19 and the 9th term is 44. Work out the 20th term. [3 marks]

Answer

C6 Explain why $3x - 2y = 5$ and $6x - 4y = 7$ cannot both be true. [2 marks]

D Exam-style questions

- D1** Raj solves $5x + 2y = 16$ and $3x - 2y = 8$. He writes, "I subtract the equations, so $2x = 8$ and $x = 4$." [3 marks]

Explain what Raj has done wrong, and solve the equations correctly.

- D2** For a school, 6 footballs and 4 netballs cost £87, and 4 footballs and 5 netballs cost £75.50.

- (a) Work out the cost of one football and the cost of one netball. [4 marks]

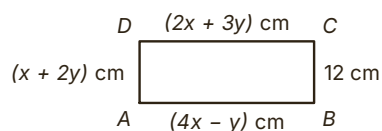
Answer

- (b) With £200 it buys 10 footballs. How many netballs can it buy with the rest? [2 marks]

Answer

Total for D2: 6 marks

- D3** $ABCD$ is a rectangle. The lengths of its sides are shown.



Not drawn accurately

- (a) Work out the value of x and the value of y . [3 marks]

Answer

- (b) Work out the area of the rectangle. [2 marks]

Answer

Total for D3: 5 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** The curve $y = ax^2 + bx$ passes through (2, 10) and (3, 24). Find a and b , and the other value of x where the curve meets the x -axis. [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Put each point into the equation.
Hint 2 $4a + 2b = 10$ and $9a + 3b = 24$.
Hint 3 Solve them; then solve $ax^2 + bx = 0$, not $x = 0$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can solve by adding or subtracting. ☐ ☐ ☐

I can solve by substituting. ☐ ☐ ☐

I can multiply first to match a term. ☐ ☐ ☐