Name:

Exam Style Questions

# Simultaneous Equations

Corbettmaths

Equipment needed: Calculator, pen

**Guidance**

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 295

Answers and Video Solutions

1. Solve the simultaneous equations

$$5x + 3y = 41$$
$$2x + 3y = 20$$

sub

$3x = 21$

$x = 7$

$5 \times 7 + 3y = 41$

$35 + 3y = 41$

$3y = 6$

$y = 2$

Check

$2 \times 7 + 3 \times 2$

$14 + 6 = 20$ ✓

x = 7 y = 2

**(3)**

2. Solve the simultaneous equations

$$5x + y = 11$$
$$3x - y = 9$$

add

$8x = 20$

$x = 2.5$

$12.5 + y = 11$

$y = -1.5$

check $7.5 - (-1.5) = 9$ ✓

x = 2.5 y = −1.5

**(3)**

3. Solve the simultaneous equations

$$x + 7y = 64$$
$$x + 3y = 28$$

sub

$4y = 36$

$y = 9$

$x + 63 = 64$

$x = 1$

Check

$1 + 27 = 28$ ✓

x = 1 y = 9

**(3)**

4. Solve the simultaneous equations

$$4x - 4y = 24$$
$$x - 4y = 3$$

sub

$3x = 21$

$x = 7$

$28 - 4y = 24$

$-4y = -4$

$y = 1$

$7 - (4) = 3$ ✓

x = 7 y = 1

**(3)**

5. Solve the simultaneous equations

$$2x + 4y = 14$$
$$4x - 4y = 4$$

Add

$6x = 18$

$x = 3$

$6 + 4y = 14$

$4y = 8$

$y = 2$

check

$12 - 8 = 4$ ✓

x = 3 y = 2

**(3)**

6. David buys 2 scones and 2 coffees in a shop and the cost is £18.
Ellie buys 3 scones and 2 coffees in the same shop and they cost £22.

Form two equations and solve to find the cost of each scone and each coffee.

$3x + 2y = 22$

$2x + 2y = 18$

$x = 4$

$8 + 2y = 18$

$2y = 10$

$y = 5$

check

$12 + 10 = 22$ ✓

Scone = £4 Coffee = £5

**(4)**

7. Alan and Connor have £6.70 in total.
Alan has £1.70 more than Connor.

Let a be the amount of money Alan has.
Let c be the amount of money Connor has.

Set up a pair of simultaneous equations and solve to find out how much each person has.

$a + c = 6.7$

add $a - c = 1.7$

$2a = 8.4$

$a = 4.2$

$4.2 + c = 6.7$

$c = 2.5$

check ✓

$4.2 - 2.5 = 1.7$

Alan = £4.20 Connor = £2.50

**(3)**

8. Solve the simultaneous equations

$$6x + y = -2$$

sub $$6x - 3y = 14$$

$4y = -16$

$y = -4$

$6x - 4 = -2$

$6x = 2$

$x = \frac{1}{3}$

check $2 + 12 = 14$ ✓

x = $\frac{1}{3}$ y = $-4$

**(3)**

9. Solve the simultaneous equations

$$2x + 4y = 26$$
$$3x - y = 4 \quad \times 4$$

$12x - 4y = 16$

add $2x + 4y = 26$

$14x = 42$

$x = 3$

$6 + 4y = 26$

$4y = 20$

$y = 5$

check

$9 - 5 = 4$ ✓

x = 3 y = 5

**(3)**

10. Solve the simultaneous equations

$$3x + 2y = 16 \quad \times 3$$
$$2x - 3y = 2 \quad \times 2$$

Do not use trial and improvement

$9x + 6y = 48$

add $4x - 6y = 4$

$13x = 52$

$x = 4$

$12 + 2y = 16$

$2y = 4$

$y = 2$

check

$8 - 6 = 2$ ✓

x = 4 y = 2

**(4)**

11. Solve the simultaneous equations

$$3x - 2y = 14$$
$$x + 2y = 10$$

add

$4x = 24$

$x = 6$

$6 + 2y = 10$

$2y = 4$

$y = 2$

check

$18 - 4 = 14$ ✓

x = 6 y = 2

**(3)**

12. Solve the simultaneous equations

$$3x + 5y = 1 \quad \times 3$$
$$2x - 3y = 7 \quad \times 5$$

$9x + 15y = 3$

add $10x - 15y = 35$

$19x = 38$

$x = 2$

$6 + 5y = 1$

$5y = -5$

$y = -1$

check

$4 - (-3) = 7$ ✓

x = 2 y = −1

**(4)**

13. Solve the simultaneous equations

$3x - y = 23$ $\times 3$

$2x + 3y = 8$

$9x - 3y = 69$

$2x + 3y = 8$

$11x = 77$

$x = 7$

$14 + 3y = 8$

$3y = -6$

$y = -2$

Check

$21 - (-2) = 23$ ✓

x = 7 y = -2

**(3)**

14. Solve the simultaneous equations

$2y - 5x = 9$ $\times 3$

$4y + 3x = 5$ $\times 5$

$6y - 15x = 27$

$20y + 15x = 25$

$26y = 52$

$y = 2$

$8 + 3x = 5$

$3x = -3$

$x = -1$

$4 - (-5) = 9$ ✓

x = -1 y = 2

**(3)**

15. Solve the simultaneous equations

$2x + 9y = 43$ ×2

$3x + 2y = 7$ ×9

$27x + 18y = 63$

sub $4x + 18y = 86$

$23x = -23$

$x = -1$

$-3 + 2y = 7$

$2y = 10$

$y = 5$

check

$-2 + 45 = 43$ ✓

x = −1 y = 5

**(3)**

16. Solve the simultaneous equations

$5x - 3y = 24$ ×4

$2x - 4y = 4$ ×3

$20x - 12y = 96$

sub $6x - 12y = 12$

$14x = 84$

$x = 6$

$30 - 3y = 24$

$-3y = -6$

$y = 2$

check

$12 - 8 = 4$ ✓

x = 6 y = 2

**(3)**

17. A museum sells adult tickets or child tickets.

Fozia buys 4 adult ($x$) tickets and 1 child ($y$) ticket for £120

Sami buys 5 adult tickets and 3 child tickets for £171

Work out the cost of each type of ticket.

$4x + y = 120 \quad \times 3$

$5x + 3y = 171$

$12x + 3y = 360$

sub $5x + 3y = 171$

$7x = 189$

$x = 27$

$108 + y = 120$

$y = 12$

check

$135 + 36 = 171$

Adult ticket £ 27

Child ticket £ 12

**(4)**

18. Solve the simultaneous equations

$$4x + 3y = 7.5 \quad \times 5$$
$$3x - 5y = 10.7 \quad \times 3$$

$20x + 15y = 37.5$

$9x - 15y = 32.1$

$29x = 69.6$

$x = 2.4$

$9.6 + 3y = 7.5$

$3y = -2.1$

$y = -0.7$

x = 2.4 y = -0.7

**(3)**

19. Solve the simultaneous equations

$$2y = 8x + 11$$
$$2x + 8y = 27$$

$2y - 11 = 8x$

$-11 = 8x - 2y$

$8x - 2y = -11 \quad \times 4$

$32x - 8y = -44$

Add $2x + 8y = 27$

$34x = -17$

$x = -0.5$

check

$7 = -4 + 11$ ✓

$-1 + 8y = 27$

$8y = 28$

$y = 3.5$

x = -0.5 y = 3.5

**(3)**

20. Find the coordinates of the point where the straight lines below cross.

$$y - 3x = 3$$
$$x - 2y = 4$$

$-3x + y = 3 \quad \times 2$

$x - 2y = 4$

Add $-6x + 2y = 6$

$-5x = 10$

$x = -2$

$y + 6 = 3$

$y = -3$

check

$-2 + 6 = 4$ ✓

(-2 , -3)

**(4)**

21. Solve the simultaneous equations

$$3a + c = 8$$
$$2a - c = 7$$

Add

$5a = 15$

$a = 3$

$9 + c = 8$

$c = -1$

$6 - -1 = 7$ ✓

a = 3 c = −1

**(3)**

22. Solve the simultaneous equations

$$9x - 6y = 114 \quad \times 3$$
$$5x - 9y = 30.75 \quad \times 2$$

$27x - 18y = 342$

sub $10x - 18y = 61.5$

$17x = 280.5$

$x = 16.5$

$82.5 - 9y = 30.75$

$-9y = -51.75$

$y = 5.75$

check

$148.5 - 34.5 = 114$ ✓

x = 16.5 y = 5.75

**(4)**

23. Solve the simultaneous equations

$$2y = x + 10$$
$$y = 2x - 7 \quad \times 2$$

$2y = 4x - 14$

sub $2y = x + 10$

$0 = 3x - 24$

$3x = 24$

$x = 8$

$2y = 8 + 10$

$2y = 18$

$y = 9$

check

$9 = 2 \times 8 - 7$

$9 = 16 - 7$ ✓

x = 8 y = 9

**(3)**

24. Solve the simultaneous equations

$$4x - y = 17$$
$$y = x - 2$$

$-x + y = -2$

Add $4x - y = 17$

$3x = 15$

$x = 5$

sub into $4x - y = 17$

$20 - y = 17$

$y = 3$

check

$3 = 5 - 2$ ✓

x = 5 y = 3

**(3)**

x y

25. Three bananas and two pears cost £2.07
Five bananas and three pears cost £3.33

Find the cost of ten bananas and ten pears.

$3x + 2y = 207$ $\times 5$
$5x + 3y = 333$ $\times 3$

$15x + 10y = 1035$
sub $15x + 9y = 999$
$y = 36$

$3x + 72 = 207$
$3x = 135$
$x = 45$

$360 + 450 =$

£8.10

(4)

26. Solve the simultaneous equations

$5x + 2y = -34$ $\times 3$
$4x - 3y = -41$ $\times 2$

$15x + 6y = -102$
add $8x - 6y = -82$
$23x = -184$
$x = -8$

$-40 + 2y = -34$
$2y = 6$
$y = 3$

check
$-32 - 9 = -41$

x = -8 y = 3

(4)

27. Albie is training for a marathon.
He jogs either route A or route B.

During April, he jogs route A nine times and route B five times.
Route B is 8 miles longer than route A.
In total, he jogs 89 miles in April.

In May, he will start jogging route C.
Route C is 20% longer than route B.

Work out the length of route C.

$9A + 5B = 89$
$B - A = 8$

$9A + 5B = 89$
$-A + B = 8 \quad \times 9$

$-9A + 9B = 72$
$9A + 5B = 89$

$14B = 161$
$B = 11.5$

$A = 3.5$

10% of $11.5 = 1.15$
20% of $11.5 = 2.3$

$11.5 + 2.3 = 13.8$

13.8 .....miles
**(6)**

28. Solve the simultaneous equations

$$6x + 2y = 13c$$
$$x + 2y = -2c$$

where c is a constant

Give your answers in terms of c.

$6x + 2y = 13c$

Sub $x + 2y = -2c$

$5x = 15c$

$x = 3c$

$3c + 2y = -2c$

$2y = -5c$

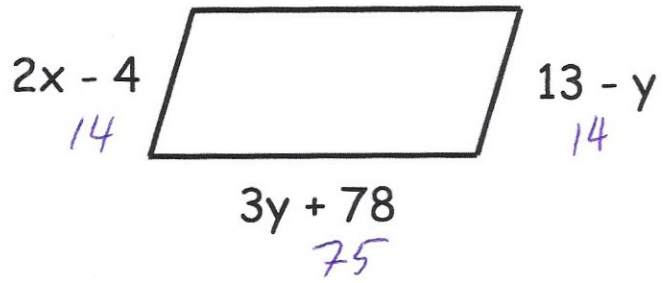
$y = -2.5c$

or

$y = -\frac{5}{2}c$

x = 3c ..... y = -2.5c ..... **(4)**

29. Shown below is a parallelogram.




Work out the perimeter of the parallelogram.

$8x + 3 = 3y + 78$

$8x - 3y = 75$

$2x - 4 = 13 - y$

$2x + y = 17$

$8x - 3y = 75$

add $6x + 3y = 51$

$14x = 126$

$x = 9$

$18 + y = 17$

$y = -1$

$75 + 14 + 75 + 14$

178 .....cm

**(6)**