

Name: _____

Exam Style Questions

Simultaneous Equations



Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic

www.corbettmaths.com/contents

Video 295

Video 296



1. Solve the simultaneous equations

$$\begin{array}{l} 5x + 3y = 41 \quad \text{--- (1)} \\ 2x + 3y = 20 \quad \text{--- (2)} \end{array}$$

Do not use trial and improvement

$$\begin{array}{l} \text{sub} \\ 5x + 3y = 41 \\ \underline{2x + 3y = 20} \\ 3x = 21 \\ x = 7 \end{array}$$

putting $x=7$ into (1)

$$\begin{array}{l} 35 + 3y = 41 \\ 3y = 6 \quad y = 2 \end{array}$$

check with (2)
 $14 + 6 = 20 \checkmark$

$$x = \underline{7} \quad y = \underline{2}$$

(3)

2. Solve the simultaneous equations

$$\begin{array}{l} 5x + y = 11 \quad \text{--- (1)} \\ 3x - y = 9 \quad \text{--- (2)} \end{array}$$

Do not use trial and improvement

$$\begin{array}{l} \text{add} \\ 5x + y = 11 \\ \underline{3x - y = 9} \\ 8x = 20 \\ x = 2.5 \end{array}$$

putting $x=2.5$ into (1)

$$\begin{array}{l} 12.5 + y = 11 \\ y = -1.5 \end{array}$$

check with (2)
 $7.5 - 1.5 = 9 \checkmark$

$$x = \underline{2.5} \quad y = \underline{-1.5}$$

(3)

3. Solve the simultaneous equations

$$x + 7y = 64 \quad \text{--- (1)}$$

$$x + 3y = 28 \quad \text{--- (2)}$$

Do not use trial and improvement

$$\begin{array}{r} x + 7y = 64 \\ \text{sub } x + 3y = 28 \\ \hline 4y = 36 \\ y = 9 \end{array}$$

Putting $y = 9$ into (1)

$$\begin{array}{r} x + 63 = 64 \\ x = 1 \end{array}$$

check with (2)

$$1 + 27 = 28 \quad \checkmark$$

$$x = \dots\dots\dots 1 \dots\dots\dots y = \dots\dots\dots 9 \dots\dots\dots$$

(3)

4. Solve the simultaneous equations

$$4x - 4y = 24 \quad \text{--- (1)}$$

$$x - 4y = 3 \quad \text{--- (2)}$$

Do not use trial and improvement

$$\begin{array}{r} 4x - 4y = 24 \\ \text{sub } x - 4y = 3 \\ \hline 3x = 21 \\ x = 7 \end{array}$$

Putting $x = 7$ into (1)

$$\begin{array}{r} 28 - 4y = 24 \\ -4y = -4 \\ y = 1 \end{array}$$

check with (2)

$$7 - 4 = 3 \quad \checkmark$$

$$x = \dots\dots\dots 7 \dots\dots\dots y = \dots\dots\dots 1 \dots\dots\dots$$

(3)

5. Solve the simultaneous equations

$$\begin{array}{r} 2x + 4y = 14 \quad - \textcircled{1} \\ 4x - 4y = 4 \quad - \textcircled{2} \end{array}$$

Do not use trial and improvement

$$\begin{array}{r} 2x + 4y = 14 \\ \text{add } 4x - 4y = 4 \\ \hline 6x = 18 \end{array}$$

$$x = 3$$

putting $x=3$ into $\textcircled{1}$

$$\begin{array}{r} 6 + 4y = 14 \\ 4y = 8 \\ y = 2 \end{array}$$

check with $\textcircled{2}$
 $12 - 8 = 4 \checkmark$

$$x = \overset{3}{\dots\dots\dots} \quad y = \overset{2}{\dots\dots\dots} \quad \textcircled{3}$$

6. David buys 2 DVDs and 2 CDs in a shop and in total they cost £18.
 Ellie buys 3 DVDs and 2 CDs in the same shop and they cost £22.

Form two equations and solve to find the cost of each DVD and each CD.

$$\begin{array}{r} 3x + 2y = 22 \quad - \textcircled{1} \\ \text{sub } 2x + 2y = 18 \quad - \textcircled{2} \\ \hline x = 4 \end{array}$$

check with $\textcircled{2}$
 $8 + 10 = 18 \checkmark$

putting $x=4$ into $\textcircled{1}$

$$\begin{array}{r} 12 + 2y = 22 \\ 2y = 10 \\ y = 5 \end{array}$$

$$\text{DVD} = \text{£} \overset{4}{\dots\dots\dots} \quad \text{CD} = \text{£} \overset{5}{\dots\dots\dots} \quad \textcircled{4}$$

7. Solve the simultaneous equations

$$\begin{aligned} \textcircled{1} - & 2x + 4y = 26 \\ \textcircled{2} - & 3x - y = 4 \quad \times 4 \end{aligned}$$

Do not use trial and improvement

$$\begin{aligned} & 2x + 4y = 26 \\ \text{add} \quad & 12x - 4y = 16 \\ \hline & 14x = 42 \\ & x = 3 \\ \text{sub into } \textcircled{1} & \\ & 6 + 4y = 26 \\ & 4y = 20 \\ & y = 5 \end{aligned}$$

check with $\textcircled{2}$
 $9 - 5 = 4 \checkmark$

x = 3 y = 5
 (3)

8. Solve the simultaneous equations

$$\begin{aligned} \textcircled{1} - & 3x + 2y = 16 \quad \times 3 \\ \textcircled{2} - & 2x - 3y = 2 \quad \times 2 \end{aligned}$$

Do not use trial and improvement

$$\begin{aligned} & 9x + 6y = 48 \\ \text{add} \quad & 4x - 6y = 4 \\ \hline & 13x = 52 \\ & x = 4 \\ \text{put } x=4 \text{ into } \textcircled{1} & \\ & 12 + 2y = 16 \\ & 2y = 4 \\ & y = 2 \end{aligned}$$

check with $\textcircled{2}$
 $8 - 6 = 2 \checkmark$

x = 4 y = 2
 (4)

9. Solve the simultaneous equations

$$\begin{array}{r} 3x - 2y = 14 \quad \text{--- (1)} \\ x + 2y = 10 \quad \text{--- (2)} \end{array}$$

Do not use trial and improvement

$$\begin{array}{r} 3x - 2y = 14 \\ + \quad x + 2y = 10 \\ \hline 4x = 24 \\ x = 6 \end{array}$$

Put $x=6$ into (1)

$$\begin{array}{r} 18 - 2y = 14 \\ -2y = -4 \\ y = 2 \end{array}$$

check with (2)

$$6 + 4 = 10 \checkmark$$

$x = 6$ $y = 2$

..... (3)

10. Solve the simultaneous equations

$$\begin{array}{r} \text{(1)} \quad 3x + 5y = 1 \quad \times 3 \\ \text{(2)} \quad 2x - 3y = 7 \quad \times 5 \end{array}$$

Do not use trial and improvement

$$\begin{array}{r} 9x + 15y = 3 \\ + \quad 10x - 15y = 35 \\ \hline 19x = 38 \\ x = 2 \end{array}$$

Put $x=2$ into (1)

$$\begin{array}{r} 6 + 5y = 1 \\ 5y = -5 \\ y = -1 \end{array}$$

check with (2)

$$4 - 3 = 1 \checkmark$$

$x = 2$ $y = -1$

..... (4)

11. Solve the simultaneous equations

$$\begin{array}{l} \textcircled{1} \quad 3x - y = 23 \quad \times 3 \\ \textcircled{2} \quad 2x + 3y = 8 \end{array}$$

Do not use trial and improvement

add

$$\begin{array}{r} 9x - 3y = 69 \\ 2x + 3y = 8 \\ \hline 11x = 77 \\ x = 7 \\ \text{Put } x=7 \text{ into } \textcircled{1} \\ 21 - y = 23 \\ y = -2 \end{array}$$

check in $\textcircled{2}$
 $14 + (-6) = 8 \checkmark$

$$x = \underline{7} \quad y = \underline{-2}$$

(3)

12. Solve the simultaneous equations

$$\begin{array}{l} \textcircled{1} \quad 2y - 5x = 9 \quad \times 2 \\ \textcircled{2} \quad 4y + 3x = 5 \end{array}$$

Do not use trial and improvement

$$\begin{array}{r} 4y - 10x = 18 \\ 4y + 3x = 5 \\ \hline -13x = 13 \\ x = -1 \\ \text{Put } x=-1 \text{ into } \textcircled{1} \\ 2y + 5 = 9 \\ y = 2 \end{array}$$

check with $\textcircled{2}$
 $8 + (-3) = 5 \checkmark$

$$x = \underline{-1} \quad y = \underline{2}$$

(3)

13. Find the coordinates where the straight lines below cross.

$$\begin{aligned} y - 3x &= 3 & \text{--- (1)} \\ x - 2y &= 4 & \text{--- (2)} \end{aligned}$$

$$\begin{aligned} -3x + y &= 3 & \times 2 \\ x - 2y &= 4 \end{aligned}$$

$$\begin{array}{r} \text{add} \\ -6x + 2y = 6 \\ x - 2y = 4 \\ \hline -5x = 10 \end{array}$$

$$\begin{aligned} -5x &= 10 \\ x &= -2 \\ \text{Put } x &= -2 \text{ into (1)} \end{aligned}$$

$$\begin{aligned} y - (-6) &= 3 \\ y + 6 &= 3 \\ y &= -3 \\ \text{check with (2)} \\ -2 + 6 &= 4 \checkmark \end{aligned}$$

$$(-2, -3)$$

(4)

14. Solve the simultaneous equations

$$\begin{aligned} 3a + c &= 8 & \text{--- (1)} \\ 2a - c &= 7 & \text{--- (2)} \end{aligned}$$

$$\text{add} \quad \underline{\hspace{2cm}}$$

Do not use trial and improvement

$$5a = 15$$

$$a = 3$$

$$\text{Put } a = 3 \text{ into (1)}$$

$$9 + c = 8$$

$$c = -1$$

$$\begin{aligned} \text{check with (2)} \\ 6 - 1 &= 7 \checkmark \end{aligned}$$

$$a = 3 \quad c = -1$$

(3)

15. Solve the simultaneous equations

$$\begin{array}{l} \textcircled{1} \quad 4x + 3y = 5 \\ \textcircled{2} \quad 2x - 5y = 9 \quad \times 2 \end{array}$$

Do not use trial and improvement

$$\begin{array}{r} 4x + 3y = 5 \\ \text{sub } 4x - 10y = 18 \\ \hline 13y = -13 \\ y = -1 \\ \text{put } y = -1 \text{ into } \textcircled{1} \\ 4x - 3 = 5 \\ 4x = 8 \\ x = 2 \end{array}$$

check in $\textcircled{2}$
 $4 - 5 = 9 \checkmark$

$x = 2 \quad y = -1$
 (4)

16. Solve the simultaneous equations

$$\begin{array}{l} \textcircled{1} \quad 2y = x + 10 \\ \textcircled{2} \quad y = 2x - 7 \quad \times 2 \end{array}$$

Do not use trial and improvement

$$\begin{array}{r} 2y = x + 10 \\ \text{sub } 2y = 4x - 14 \\ \hline 0 = -3x + 24 \\ -24 = -3x \\ x = 8 \\ \text{put } x = 8 \text{ into } \textcircled{1} \\ 2y = 8 + 10 \\ 2y = 18 \\ y = 9 \end{array}$$

check with $\textcircled{2}$
 $9 = 16 - 7 \checkmark$

$x = 8 \quad y = 9$
 (3)

17. Solve the simultaneous equations

$$\begin{array}{l} \textcircled{1} \quad 4x - y = 17 \\ \textcircled{2} \quad y = x - 2 \end{array} \quad -x + y = -2$$

Do not use trial and improvement

$$\begin{array}{r} 4x - y = 17 \\ \text{add } -x + y = -2 \\ \hline 3x = 15 \end{array}$$

$$x = 5$$

Sub into $\textcircled{1}$

$$\begin{array}{l} 20 - y = 17 \\ y = 3 \end{array}$$

check in $\textcircled{2}$
 $3 = 5 - 2 \checkmark$

$$x = \underline{5} \quad y = \underline{3} \quad (3)$$

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

$$\begin{array}{l} a + c = 6.7 \quad \textcircled{1} \\ a - c = 1.7 \quad \textcircled{2} \end{array}$$

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.

$$\begin{array}{r} a + c = 6.7 \\ \text{add } a - c = 1.7 \\ \hline 2a = 8.4 \\ a = 4.2 \quad \text{sub into } \textcircled{1} \end{array}$$

$$\begin{array}{l} 4.2 + c = 6.7 \\ c = 2.5 \end{array}$$

$$\text{Alan} = \underline{\pounds 4.20} \quad \text{Connor} = \underline{\pounds 2.50} \quad (3)$$

19. Three bananas and two pears cost 95p.
Five bananas and three pears cost £1.51

Find the cost of ten bananas and ten pears.

$$\begin{aligned} \textcircled{1} \quad 3x + 2y &= 95 && \times 5 \\ \textcircled{2} \quad 5x + 3y &= 151 && \times 3 \\ \hline 15x + 10y &= 475 \\ \text{sub } 15x + 9y &= 453 \\ \hline y &= 22 \\ \text{sub } y=22 \text{ into } \textcircled{1} & && \end{aligned}$$

$$\begin{aligned} 3x + 44 &= 95 \\ 3x &= 51 \\ x &= 17 \\ \text{check in } \textcircled{2} \\ 85 + 66 &= 151 \checkmark \\ 10 \times 17 + 10 \times 22 &= \\ \underline{\underline{390}} & \\ & \text{(4)} \end{aligned}$$

20. Solve the simultaneous equations

$$\begin{aligned} \textcircled{1} \quad 5x + 2y &= -34 && \times 3 \\ \textcircled{2} \quad 4x - 3y &= -41 && \times 2 \end{aligned}$$

Do not use trial and improvement

$$\begin{aligned} 15x + 6y &= -102 \\ \text{add } 8x - 6y &= -82 \\ \hline 23x &= -184 \\ x &= -8 \\ \text{sub } x=-8 \text{ into } \textcircled{1} \\ -40 + 2y &= -34 \\ 2y &= 6 \\ y &= 3 \end{aligned}$$

$$\begin{aligned} \text{check with } \textcircled{2} \\ -32 - 9 &= -41 \checkmark \end{aligned}$$

$$x = \underline{\underline{-8}} \quad y = \underline{\underline{3}} \quad \text{(4)}$$