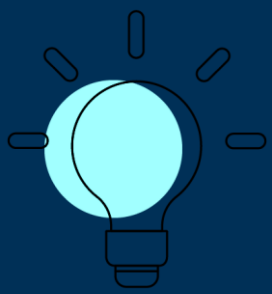
Pearson
Edexcel

Mathematics in Context (7MC0)

Topic Worksheet:

Solving Equations

Total Marks – 24



Welcome to Level 3 Core Mathematics!

Thank you for choosing to study mathematics in the sixth form at Lady Lumley's School. In order that you make the best possible start to the course, we have prepared this booklet for you on **solving equations**. It is vitally important that you spend some time working through the questions in this booklet over the summer (answers are at the back) - you will need to have a good knowledge of this topic before you commence your course in September. You should be familiar with this from GCSE! Please bring your completed work to your first Core Maths lesson in September.

You must purchase an appropriate calculator which performs statistical calculations. We recommend Casio FX-991CW and we will be teaching using this calculator throughout the course.

Mrs Steele Head of Mathematics

Useful Links

Solving equations video link

Mathematics in Context - Qualifications website link

Solve the simultaneous equations

$$2x + 2y = 10$$

$$5x + 3y = 19$$

x = ...

y = ...

(Total for question is 3 marks)

Practice questions

1 Solve $7(f - 5) = 28$

$f =$ .....

(Total for Question 1 is 2 mark)

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2 Solve $\frac{y}{4} = 10.5$

$y =$ .....

(Total for Question 2 is 1 mark)

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3 $T = 3x + 4y$

Work out the value of T when $x = 5$ and $y = -7$

.....

(Total for Question 3 is 2 marks)

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4 Solve $5x - 6 = 3(x - 1)$

$x =$ .....

(Total for Question 4 is 3 marks)

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5 Solve $\frac{5 - x}{2} = 2x - 7$

$x =$ .....

(**Total for Question 5 is 3 marks**)

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6 Solve the simultaneous equations

$$3x + y = -4$$

$$3x - 4y = 6$$

x = ...

y = ...

(Total for Question 6 is 3 marks)

7 Solve the simultaneous equations

$$5x + y = 21$$

$$x - 3y = 9$$

x = ...

y = ...

(Total for Question 7 is 3 marks)

Questions in Context – Complete this!

A farmer has two types of field, low fields and valley fields.
He grows pumpkins in his fields.

The yield, in tons per acre, in each type of field depends on the weather.

The table below gives the yields, in tons per acre, for the different fields in different weather conditions.

	Wet weather	**Dry weather**
Low fields	31	8
Valley fields	6	50

The farmer considers growing half the pumpkins in the low fields and half the pumpkins in the valley fields.

Let x be the fraction of pumpkins grown in the low fields and y be the fraction of pumpkins grown in the valley fields.

(b) (i) Explain why $x + y = 1$

(1)

The farmer needs to ensure a total yield of 24 tons per acre in wet weather conditions.

(ii) Use this information to write down another equation in x and y.

(1)

(iii) Hence, or otherwise, find the value of x and the value of y.

(4)

Questions in Context

8 Ben is n years old.

Chloe is twice as old as Ben.

Dan is five years younger than Ben.

The total of Ben's age, Chloe's age and Dan's age is T years.

Find a formula for T in terms of n.

.....

(Total for Question 8 is 3 marks)

9 You can use this rule to work out the total hire charge, in pounds (£),

for hiring a 3D printer for a number of weeks.

Total hire charge (£) = number of weeks × 70 + 50

Mia wants to hire a 3D printer for 4 weeks.

(a) Work out the total hire charge.

£.....

(2)

Zahir hires a 3D printer.

The total hire charge is £680

(b) For how many weeks does Zahir hire the 3D printer?

..... weeks

(2)

(Total for Question 9 is 4 marks)

Mark schemes

Practice questions

Part	Working or answer an examiner might expect to see	Mark	Notes
1	$7f - 35 = 28$ $7f = 63$	M1	This mark is given for a method to expand brackets
	$f = 9$	A1	This mark is given for the correct answer only

(2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
2	$y = 4 \times 10.5 = 42$	B1	This mark is given for the correct answer only

(1 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
3	$T = (3 \times 5) + (4 \times -7)$ $= 15 - 28$	M1	This mark is given for a method to substitute values to find T
	$T = -13$	A1	This mark is given for the correct answer only

(2 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
4	$5x - 6 = 3x - 3$	M1	This mark is given for expanding brackets
	$5x - 6 - 3x = -3$ $2x - 6 = -3$	M1	This mark is given for isolating x on one side of the equation
	$2x = 3$ $x = 1\frac{1}{2}$	A1	This mark is given for the correct answer only

(3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
5	$5 - x = 2(2x - 7)$ $5 - x = 4x - 14$	M1	This mark is given for a method to remove the fraction from the equation
	$4x + x = 14 + 5$ $5x = 19$	M1	This mark is given for a method to isolate x on one side of the equation
	$x = 3.8$	A1	This mark is given for the correct answer only

(3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
6	$3x - 3x = 0$, $y - -4y = 5y$, $4 - 6 = -10$ $5y = -10$	M1	This mark is given for a method to eliminate one variable
	$y = -2$ $3x - 2 = -4$ or $3x + 8 = 6$	M1	This mark is given for substituting one found value in one of the equations
	$3x = -2$ $x = -\frac{2}{3}$, $(y = -2)$	A1	This mark is given for a correct pair of answers only

(3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
7	$15x + 3y = 63$ $x - 3y = 9$	M1	This mark is given for a method to eliminate one variable
	$16x = 72$ $x = 4.5$	M1	This mark is given for a method to find the value of one variable
	$4.5 - 3y = 9$ $y = -1.5$	A1	This mark is given for both correct solutions

(3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
8	Ben's age = n Chloe's age = $2n$ Dan's age = $n - 5$	M1	This mark is given for a method to find algebraic expressions for the ages of Ben, Chloe and Dan
	$T = n + 2n + n - 5$	M1	This mark is given for method to find an algebraic expression for T
	$T = 4n - 5$	A1	This mark is given for the correct answer only

(3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
9(a)	$4 \times 70 + 50$	P1	This mark is given for a method to find the total hire charge
	330	A1	This mark is given for the correct answer only
(b)	$\frac{680 - 50}{70}$	P1	This mark is given for a method to find the number of weeks the printer was hired for
	9	A1	This mark is given for the correct answer only

(4 marks)