

Foundation Check In - 6.03 Algebraic equations

Solve the following equations:

1. $x + 3 = 7$
2. $2x + 1 = 11$
3. $3(x - 2) = 4$
4. $2(x - 2) + 3x = 6$
5. $3x - 1 = 9 - 2x$
6. Given that $213x + 431 = 548$, what is $426x + 862$ equal to? Explain why.
7. Explain how the graph of $y = 2x + 5$ could be used to find the value of x when $y = 3$.
8. Explain why the equation $2(x - 1) + 3(2 - 3x) = 4 - 7x$ appears to have no solutions.
9. The cost £ C of a taxi journey is calculated using the equation $C = 2d + 5$ where d is the distance in miles. If the cost of a journey doubles from £15 to £30, how much further is it?

10. The cost of electricity tariffs provided by 'Green Electric' is calculated using the following:

Tariff A: $C = 3u + 50$

Tariff B: $C = 2u + 200$

where u is the number of units used and C is the total cost.

How many units must a customer use for the cost of each tariff to be exactly the same?

Extension

A magician has a magic trick. He instructs the audience to do the following:

- Think of a number
- Double it
- Add 10
- Divide by 2
- Subtract the original number.

The magician then tells the audience that the final number they are thinking of is 5.

- a) Write an equation using the letter n to represent the unknown number following the steps of the trick. Can you explain why it works?



GCSE (9-1) MATHEMATICS

- b) Can you write your own version of the trick that results in the audience thinking of the number 3 in the end?

Answers

- 4
- 5
- $3\frac{1}{3}$
- 2
- 2
- 1096, the numbers have all doubled.
- Draw the line $y = 3$ and read the x coordinate where the 2 lines intersect.
- Multiplying out the brackets and collecting like terms gives $4 - 7x = 4 - 7x$. This simplifies to $0 = 0$ because the x terms and constant terms cancel out.
- $2d + 5 = 15$ so $d = 5$ for journey one. $2d + 5 = 30$ so $d = 12.5$ for journey two. Therefore it is 7.5 miles further.
- $3u + 50 = 2u + 200$ solves to give $u = 150$. Students could also solve graphically or use trial and error.

Extension

a) $(2n + 10)/2 - n$

It works because $(2n + 10)/2 - n = n + 5 - n = 5$.

b) $(2n + 6)/2 - n = n + 3 - n = 3$

We'd
but
up p



the resources we produce. By clicking on the 'Like' or 'Dislike' icons, you can let us know that our resources work for you. When the email template pops up, you can give feedback if you wish and then just click 'Send'. Thank you.

OCR Resources: the small print

OCR's resources are provided to support the teaching of OCR specifications, but in no way constitute an endorsed teaching method that is required by the Board, and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. We update our resources on a regular basis, so please check the OCR website to ensure you have the most up to date version.

© OCR 2015 - This resource may be freely copied and distributed, as long as the OCR logo and this message remain intact and OCR is acknowledged as the originator of this work.

OCR acknowledges the use of the following content: Maths and English icons: Air0ne/Shutterstock.com



Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Solve one step linear equations in one unknown algebraically.			
AO1	2	Solve two step linear equations in one unknown algebraically.			
AO1	3	Solve linear equations with brackets and one unknown algebraically.			
AO1	4	Solve linear equations with multiple terms in one unknown algebraically.			
AO1	5	Solve linear equations with one unknown on both sides of the equation algebraically.			
AO2	6	Understand the relationship between linked equations.			
AO2	7	Use a graph to find an approximate solution to a linear equation.			
AO2	8	Recognise when there are no solutions for a linear equation.			
AO3	9	Solve equations in a worded problem.			
AO3	10	Solve equations in a worded problem.			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Solve one step linear equations in one unknown algebraically.			
AO1	2	Solve two step linear equations in one unknown algebraically.			
AO1	3	Solve linear equations with brackets and one unknown algebraically.			
AO1	4	Solve linear equations with multiple terms in one unknown algebraically.			
AO1	5	Solve linear equations with one unknown on both sides of the equation algebraically.			
AO2	6	Understand the relationship between linked equations.			
AO2	7	Use a graph to find an approximate solution to a linear equation.			
AO2	8	Recognise when there are no solutions for a linear equation.			
AO3	9	Solve equations in a worded problem.			
AO3	10	Solve equations in a worded problem.			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Solve one step linear equations in one unknown algebraically.			
AO1	2	Solve two step linear equations in one unknown algebraically.			
AO1	3	Solve linear equations with brackets and one unknown algebraically.			
AO1	4	Solve linear equations with multiple terms in one unknown algebraically.			
AO1	5	Solve linear equations with one unknown on both sides of the equation algebraically.			
AO2	6	Understand the relationship between linked equations.			
AO2	7	Use a graph to find an approximate solution to a linear equation.			
AO2	8	Recognise when there are no solutions for a linear equation.			
AO3	9	Solve equations in a worded problem.			
AO3	10	Solve equations in a worded problem.			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Solve one step linear equations in one unknown algebraically.			
AO1	2	Solve two step linear equations in one unknown algebraically.			
AO1	3	Solve linear equations with brackets and one unknown algebraically.			
AO1	4	Solve linear equations with multiple terms in one unknown algebraically.			
AO1	5	Solve linear equations with one unknown on both sides of the equation algebraically.			
AO2	6	Understand the relationship between linked equations.			
AO2	7	Use a graph to find an approximate solution to a linear equation.			
AO2	8	Recognise when there are no solutions for a linear equation.			
AO3	9	Solve equations in a worded problem.			
AO3	10	Solve equations in a worded problem.			

