Hello to all our users!

In response to the challenges presented by the ongoing Coronavirus situation, the Beyond team have made it their top priority to ensure that you and your children are catered to for your home-based educational needs. As such, we have decided to introduce **Interactive Resources** that can be completed using free-to-download PDF reading software, on a home PC/Laptop or Android/IOS smart device, sparing you the need to print where possible. By following the guidance below, we hope to offer you a smooth, stress-free means of continuing your children's education from the comfort of your home.

Step 1: Download **for PC/Mac (or search 'Adobe Acrobat Reader' on Google Play or the App Store).**

Follow the link above to open the download page for the PC/Mac version of Adobe Acrobat Reader. Click 'Download Acrobat Reader' at the bottom of the middle column - this will take you to a download page where your download will begin. Open the downloaded file and Acrobat Reader will install automatically (check the 'Launch Adobe Acrobat Reader DC' checkbox before clicking 'Finish' if you would like to open the program straight away).

Step 2: Download one of our interactive resources, and open using Adobe Acrobat Reader DC.

If you are a PC/Mac user and your downloaded PDF resource does not open using Acrobat Reader by default, simply right-click your PDF file, go to 'Open with' and select Adobe Acrobat Reader DC from the drop-down list.

For smart device users, open the Adobe Acrobat Reader app, press 'Files' at the bottom of the homescreen, then press 'On this device' and select the PDF you wish to open.

Step 3: Complete the resource!

For PC/Mac users: To fill in the resource, click the text fields and type your answers as needed. Check boxes and radio buttons can simply be clicked on to make the selection of your choice. When you are finished with the resource, go to File > Save As... and save your file where you like (we recommend you do not save over the original PDF, as you may wish to use it again without first having to remove all the answers!)

For smart device users: To fill in the resource, press the text fields and type your answers as needed. Check boxes and radio buttons can simply be clicked on to make the selection of your choice. When you are finished, simply press the back button in the top left of the appscreen and your PDF will save automatically (this will overwrite the original file, so you may wish to create a copy if you would like to use the resource again in future without first having to remove all the answers!)

Step 4: Rinse and repeat!

We hope you have found this information useful. If you experience any problems in getting the above method to work, please do contact the Beyond team at and we will endeavour to do what we can to assist you.

Your Turn

1. A bag of sweets contains a number of sweets (s). Write expressions to show the following:

   a. The number of sweets in 3 of the same bag.

   $3 \times s = 3s$

   b. The number of sweets left in one bag if two sweets are taken out and not replaced.

   $s - 2$

   c. If n is the number of bags, write down the number of sweets in ($n + 2$) bags.

   s($n + 2$) or $sn + 2s$

2. I am thinking of a number. I multiply it by 4 and then subtract 7. The final answer is 25. Form and solve an equation to find the original number.

   $4x - 7 = 25$

   $4x = 32$

   $x = 8$

3. I am thinking of a number. I multiply it by 5 and then add 3. The final answer is 23. Form and solve an equation to find the original number.

   $5x + 3 = 23$

   $5x = 20$

   $x = 4$

4. A bottle containing lemonade costs £2.50. The lemonade itself costs £1. Form and solve an equation to find the cost of the bottle.

   $100 + x = 250$

   $x = 150$

   The bottle costs 150 pence or £1.50.

5. Three friends have £144 in total. Rachel has n pounds. Sioned has £16 more than Rachel. Tobias has twice as much as Rachel. Calculate the amount of money each friend has.

   $n + n + 16 + 2n = 144$
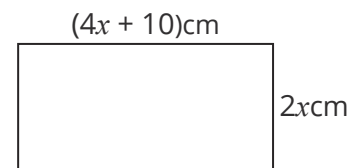
   $4n + 16 = 144$

   $4n = 128$

   $n = 32$

   Rachel: £32

   Sioned: 32 + 16 = £48

   Tobias: 2 × 32 = £64

6. The perimeter of this rectangle is 200cm. Calculate its length and width.

   (4x + 10)cm

   2$x$cm

   $4x + 10 + 2x + 4x + 10 + 2x = 200$

   $12x + 20 = 200$

   $12x = 180$

   $x = 15$

   4 × 15 + 10 = 70cm

   2 × 15 = 30cm

7. Form and solve an equation to calculate the value of all the missing angles in the triangle.
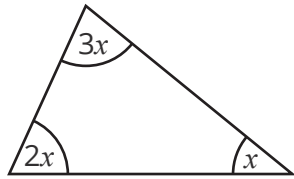
Angles in a triangle add up to 180°.

$3x + 2x + x = 180$

$6x = 180$

$x = 30°$

$2x = 60°$

$3x = 90°$

8. Two mobile phone companies are advertising their latest tariffs.

Ace Phones	**Best Phones**
£10 per month plus 8 pence per minute.	£6 per month and 12 pence per minute.

a. Write down an equation for the total monthly cost (c), in pence, in terms of the number of minutes (m) used on a phone purchased from Ace Phones.

   £10 = 1000 pence

   $c = 1000 + 8m$

b. Write down an equation for the total monthly cost (c), in pence, in terms of the number of minutes (m) used on a phone purchased from Best Phones.

   £6 = 600 pence

   $c = 600 + 12m$

c. Which of the phone companies is cheaper if you want to talk for 25 minutes per month?

Ace phones

c = 1000 + 8 × 25

c = 1200 pence (or £12)

Best phones

c = 600 + 12 × 25

c = 900 pence (or £9)

Best Phones is cheaper.

Challenge

Sam is 7 years old and Anoushka is 18 years old. In how many years will Anoushka be exactly twice as old as Sam? Form and solve an algebraic equation.

Let x = number of years when Anoushka will be twice as old as Sam.

$18 + x = 2(7 + x)$

$18 + x = 14 + 2x$

$4 = x$

4 years' time.

Forming and Solving Equations

Prior Knowledge:

Before attempting this sheet, students should already have some experience with solving one-step or two-step equations. Ideally, they should also be able to calculate the perimeter of a shape and know the angle sum of a triangle.

An equation is a mathematical statement containing **expressions and an = sign**. In equations, numbers may be represented by an **unknown variable**, such as x. To **solve** an equation, the **value** of these variables must be found.

Sometimes, a question gives you a lot of information in one go. You just have to go through it slowly and carefully and **extract the maths** from it.

Example 1:

Tim and Margot have the same number of marbles. Lisa has 26 marbles. Between all three of them, they have a total of 100 marbles. How many marbles does Margot have?

Tim and Margot have the same number of marbles. You can use letters to represent this. It has to be the **same** letter because Tim and Margot have the **same** number of marbles.

$x + x$

Lisa has 26 marbles.

$x + x + 26$

They have a total of 100 marbles.

$x + x + 26 = 100$

$2x + 26 = 100$

Now, solve the equation to find the **value** of x.

$2x = 74$

$x = 37$

Margot has 37 marbles.

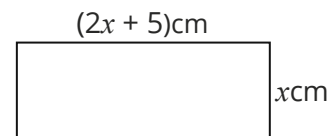It's important that you check if an answer is correct by **substituting** x for its value.

$37 + 37 + 26 = 100$

so our answer is correct.

Sometimes, you will have to form and solve an equation which involves a diagram.

Example 2:
The perimeter of this rectangle is 100cm. Calculate its length and width.

$(2x + 5)$cm

$x$cm

To find the perimeter of any shape, you must add together all the length and width measurements.

It is no different for this question; you are just going to do this using expressions instead of numbers:

$2x + 5 + x + 2x + 5 + x = 6x + 10$

You are told that the perimeter is 100cm so you can write an equation to find the value of x.

$6x + 10 = 100$

Now, solve!

$6x = 90$

$x = 15$

However, the work is not yet done as you're asked to find the length and width. We must **substitute the value of** x for 15.

$x = 15$cm

$2 \times 15 + 5 = 35$cm

The length is 35cm and the width is 15cm

Finally, check your answer.

$35 + 15 + 35 + 15 = 100$cm

Your Turn

1. A bag of sweets contains a number of sweets (s). Write expressions to show the following:

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   b. The number of sweets left in one bag if two sweets are taken out and not replaced.

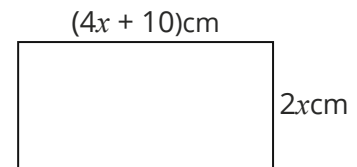   c. If n is the number of bags, write down the number of sweets in ($n + 2$) bags.

2. I am thinking of a number. I multiply it by 4 and then subtract 7. The final answer is 25. Form and solve an equation to find the original number.

3. I am thinking of a number. I multiply it by 5 and then add 3. The final answer is 23. Form and solve an equation to find the original number.

4. A bottle containing lemonade costs £2.50. The lemonade itself costs £1. Form and solve an equation to find the cost of the bottle.
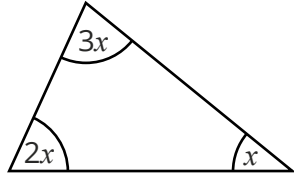
5. Three friends have £144 in total. Rachel has n pounds. Sioned has £16 more than Rachel. Tobias has twice as much as Rachel. Calculate the amount of money each friend has.

6. The perimeter of this rectangle is 200cm. Calculate its length and width.

($4x + 10$)cm

$2x$cm

7. Form and solve an equation to calculate the value of all the missing angles in the triangle.

b. Write down an equation for the total monthly cost (c), in pence, in terms of the number of minutes (m) used on a phone purchased from Best Phones.

c. Which of the phone companies is cheaper if you want to talk for 25 minutes per month?

Challenge

Sam is 7 years old and Anoushka is 18 years old. In how many years will Anoushka be exactly twice as old as Sam? Form and solve an algebraic equation.

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$x + x$

Lisa has 26 marbles.

$x + x + 26$

They have a total of 100 marbles.

$x + x + 26 = 100$
$2x + 26 = 100$

Now, solve the equation to find the **value** of x.

$2x = 74$

$x = 37$

Margot has 37 marbles.

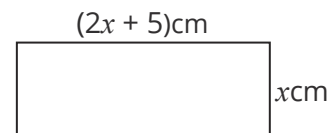It's important that you check if an answer is correct by **substituting** x for its value.

$37 + 37 + 26 = 100$

so our answer is correct.

Sometimes, you will have to form and solve an equation which involves a diagram.

Example 2:
The perimeter of this rectangle is 100cm. Calculate its length and width.

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It is no different for this question; you are just going to do this using expressions instead of numbers:

$2x + 5 + x + 2x + 5 + x = 6x + 10$

You are told that the perimeter is 100cm so you can write an equation to find the value of x.
$6x + 10 = 100$

Now, solve!
$6x = 90$
$x = 15$

However, the work is not yet done as you're asked to find the length and width. We must **substitute the value of** x for 15.

$x = 15$cm
$2 \times 15 + 5 = 35$cm
The length is 35cm and the width is 15cm

Finally, check your answer.
$35 + 15 + 35 + 15 = 100$cm

Your Turn

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   a. The number of sweets in 3 of the same bag.

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   _____

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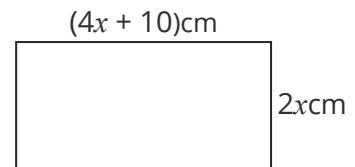
   _____

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   _____

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   _____

4. A bottle containing lemonade costs £2.50. The lemonade itself costs £1. Form and solve an equation to find the cost of the bottle.

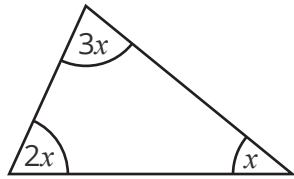   _____

   _____

   _____

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   _____

   _____

6. The perimeter of this rectangle is 200cm. Calculate its length and width.

   ($4x$ + 10)cm

   $2x$cm

   _____

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   _____

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_____

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_____

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c. Which of the phone companies is cheaper if you want to talk for 25 minutes per month?

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Challenge

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