Week 7, Day 3
Solving equations

Each day covers one maths topic. It should take you about 1 hour or just a little more.

1. Start by reading through the Learning Reminders. They come from our PowerPoint slides.

2. Tackle the questions on the Practice Sheet. There might be a choice of either Mild (easier) or Hot (harder)!
Check the answers.

3. Finding it tricky? That’s OK... have a go with a grown-up at A Bit Stuck?

4. Think you’ve cracked it? Whizzed through the Practice Sheets? Have a go at the Investigation...
Learning Reminders

Express missing number problems algebraically.

25 + a = 30

This is called an equation and ‘a’ stands for a mystery number.

<table>
<thead>
<tr>
<th>30</th>
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<tbody>
<tr>
<td>25</td>
</tr>
<tr>
<td>a</td>
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What is a?

5

6b = 42

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<th>42</th>
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<tbody>
<tr>
<td>b</td>
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If 6 times something is 42, then the something must be...

7

35 ÷ c = 7

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<th>35</th>
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<tbody>
<tr>
<td>c</td>
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</tbody>
</table>

We can think of this as 7 lots of something makes 35, so c is...

5.
Learning Reminders

Express missing number problems algebraically.

\[ 3e + 1 = 18 - 5 \]
\[ 3e + 1 = 13 \]
\[ 3e = 12 \]
\[ \text{So } e = 4 \]

Which part can we work out first?

This one needs a bit of working out first.

The = sign acts like the balance point in the middle of a see saw... To keep it balanced, we must change one side of the balance by the same amount as the other. So, if we subtract 1 from one side of the = sign, we must do the same to the other.

\[ 3 \times 5 = 17 - d \]

First, we need to calculate \(3 \times 5\).
\[ 15 = 17 - d, \text{ so } d \text{ must be...?} \]
Learning Reminders

Express missing number problems algebraically.

**What is the total of the angles inside a triangle? How can we find \( a \)?**

\[
90^\circ + 45^\circ + a^\circ = 180^\circ
\]

\[
135^\circ + a^\circ = 180^\circ
\]

So \( a = 45^\circ \)

**What is the total of the angles inside a quadrilateral? How can we find \( b \)?**

\[
80^\circ + 60^\circ + 120^\circ + b^\circ = 360^\circ
\]

\[
260^\circ + b^\circ = 360^\circ
\]

So \( b = 100^\circ \)
## Practice Sheet Mild
### Solving equations

Solve these equations:

1. $7 + a = 12$
   - Answer: $a = 12 - 7 = 5$

2. $15 - b = 8$
   - Answer: $b = 15 - 8 = 7$

3. $2c = 24$
   - Answer: $c = \frac{24}{2} = 12$

4. $d - 2 = 18$
   - Answer: $d = 18 + 2 = 20$

5. $e + 10 = 23$
   - Answer: $e = 23 - 10 = 13$

6. $4f = 24$
   - Answer: $f = \frac{24}{4} = 6$

7. $g ÷ 3 = 4$
   - Answer: $g = 4 \times 3 = 12$

8. $20 ÷ h = 5$
   - Answer: $h = \frac{20}{5} = 4$

9. $90° + 35° + a = 180°$
   - $a = 180° - 90° - 35° = 55°$

10. $60° + 85° + b = 180°$
    - $b = 180° - 60° - 85° = 35°$

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Practice Sheet Hot
Solving equations

Solve these equations:

1. $15 - a = 7$
2. $8 + b = 13$
3. $4c = 48$
4. $90 \div d = 3$
5. $5e + 2 = 32$
6. $10 + 2f = 16$

<table>
<thead>
<tr>
<th>32</th>
<th>5e</th>
</tr>
</thead>
<tbody>
<tr>
<td>5e</td>
<td>2</td>
</tr>
</tbody>
</table>

7. $72^\circ + 36^\circ + e = 180^\circ$
8. $56^\circ + 2a = 180^\circ$

9. $45^\circ + 85^\circ + 120^\circ + c = 360^\circ$
10. $130^\circ + 150^\circ + 2d = 360^\circ$

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Practice Sheets Answers

Solving equations (mild)
1. a = 5
2. b = 7
3. c = 12
4. d = 20
5. e = 13
6. f = 6
7. g = 12
8. h = 4
9. a = 55°
10. b = 35°

Solving equations (hot)
1. a = 8
2. b = 5
3. c = 12
4. d = 30
5. e = 6
6. f = 3
7. e = 72°
8. a = 62°
9. c = 110°
10. d = 40°
We can rewrite these mystery calculations with letters instead of empty boxes.

27 + a = 30  
b × 5 = 35  
c – 35 = 65  
45 ÷ d = 9

The letters just stand for mystery numbers. We’ve used a different letter in each number sentence so we don’t get confused.

Let’s solve the equations (number sentences) to find what each letter stands for, e.g. 94 + □ = 100

Choose a new letter to use instead of box – any letter is fine!

Rewrite the number sentence:

94 + □ = 100

Work out what your letter stands for.

Repeat for the following, choose a different letter for each one.

□ × 4 = 36

× 4 = 36

80 – □ = 48

80 – □ = 48

□ ÷ 2 = 54

÷ 2 = 54
Investigation
Algebra chain

\[ a + 15 = 20 \]
\[ a = \]
\[ ab = 40 \]
\[ b = \]
\[ c \div b = 2 \]
\[ c = \]
\[ d - c = 24 \]
\[ d = \]
\[ de = 120 \]
\[ e = \]
\[ ae = 15 \]
check!

- Work out what \( a \) represents in the first equation.
- \( a \) represents the same number in the second equation. So, use 5 instead of \( a \) to work out what \( b \) represents, i.e. \( 5 \times b = 40 \).
- Now work out \( b \), use this in the third equation, work out \( c \), use this in the next equation and so on.
- The last equation is a check! If your answers for \( a \) and \( e \) don’t multiply to make 15, you have made a mistake somewhere.

Challenge
Can you create a similar chain of equations?