

Solving Equations: Starters

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Starter 1: Missing Numbers & Expressions

Q4

21						
?	?	?	?	?	?	?

Grid for Q10

×	2x	3
4		

- $\frac{2}{5} = \underline{\hspace{2cm}}$
- 3^{-2}
- 0.2^{-1}
- What number multiplied by 7 makes 21?
- What number plus 8 makes 3?
- What number multiplied by 1.2 makes 60?

- How many £1.50 tickets can £12 buy?

Simplify the expressions below:

- $3a + 5b - a + 2b$
- $2a \times 3a^4$
- Expand $4(2x + 3)$ using the grid.
- Expand and simplify $3(x + 2) - 2(x - 1)$.
- Find $5 - 3x$ when $x = -2$.
- (Challenge) Think of a number, double it and add 6. Halve the result, then subtract the number you started with. Show with algebra that you always get 3.

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Starter 2: One- & Two-Step Equations

Working for Q4

$$4x - 7 = 29$$

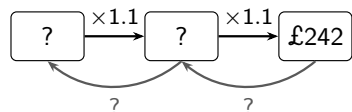
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$$4x = \underline{\quad}$$

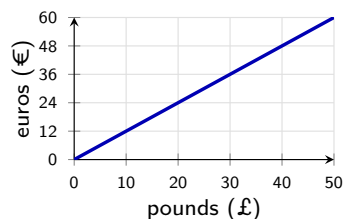
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£? at 10% compound interest



Conversion graph



1. $\frac{3}{8} = \underline{\quad}\%$ 2. 2^{-3} 3. 0.5^{-2}

4. I think of a number x , multiply it by 4 and subtract 7 to get 29. Write an equation, then complete the working on the left. Solve each equation.

5. $3x + 5 = 26$ 6. $7 - 2x = 15$

7. Complete the sentence: a reduction by 20% leaves 80% of the original amount. To find the amount after the reduction we multiply the original by $\underline{\quad}$.
8. A price falls by 20% to £36. Solve an equation to find the original price, £ p .

9. Complete the flow chart. How much was invested?

10. Use the graph to change €36 into pounds. Check by solving $1.2x = 36$.

11. (Challenge) Solve $2^{x+4} = \frac{1}{8}$.

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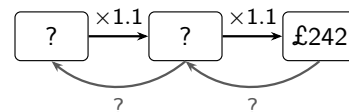
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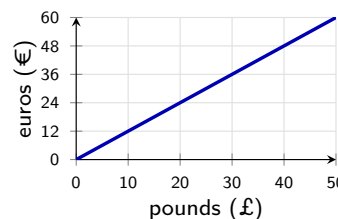
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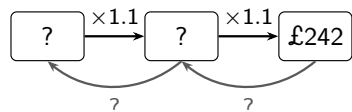
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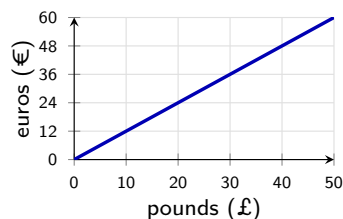
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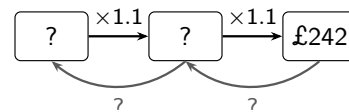
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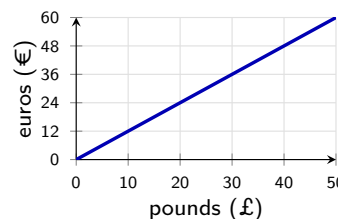
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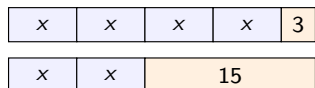
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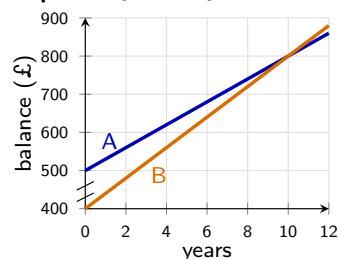
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Starter 3: Unknowns on Both Sides

Bar model for Q3



Graph for Q6 and Q7



- What is 0.45 as a fraction?
- Simplify $3x^{-2} \times 4x^5$
- Use the bar model to solve $4x + 3 = 2x + 15$.

Solve each equation below:

- $7x - 4 = 3x + 24$
- $6(x - 2) = 2x + 8$

- A has £500 at 6% and B has £400 at 10% simple interest a year. Write each balance after n years.

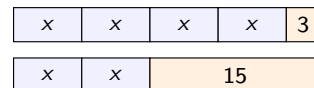
- When are the balances equal? Solve an equation, then check on the graph.

- Solve $7^{3x} = 7^{x+8}$
- What is £250 in euros, at €1.16 per £1

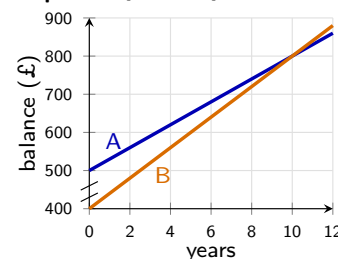
- (Challenge) $x = 0.\dot{7}$. Use $10x - x$ to write x as a fraction.

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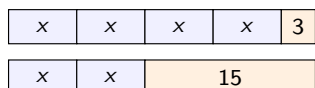
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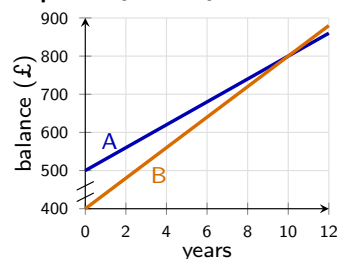
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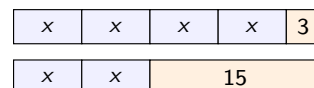
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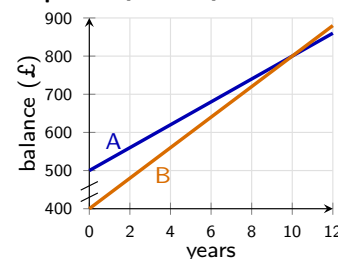
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Starter 4: Unknown in the Denominator

Bread rolls

Pack	Rolls	Price	Per roll
A	4	£1.60	—
B	6	£2.10	—
C	n	£3.60	30p

Working for Q5

$\frac{12}{x} = 3$
 $\times x \quad \times x$
 $12 = \underline{\hspace{1cm}}$
 $\div 3 \quad \div 3$
 $\underline{\hspace{1cm}} = x$

The bill for Q8
£80 plus 5%

£12	
-----	--

1. $\frac{7}{20} = \underline{\hspace{1cm}}\%$ 2. 0.4^{-2}
3. Complete the table. Which is the better buy, A or B?
4. Solve an equation to find n for pack C.

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10. (Challenge) Solve $\frac{50}{x+2} = 0.8^{-2}$.

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Starter 5: Equations with Fractions

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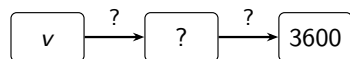
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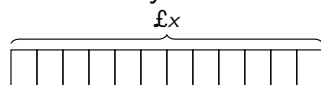
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A car's value in £, over 2 years



Sam's money



1. $\frac{1}{3} + \frac{1}{4}$

Solve each equation.

3. $\frac{x+2}{3} = 5$

2. $\left(\frac{3}{4}\right)^{-2}$

4. $\frac{2x-1}{5} = 3$

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6. $\frac{x+3}{2} = \frac{x+7}{3}$

7. A car loses 25% of its value each year. Complete the flow chart, then solve an equation for v .

8. Sam has £ x . He spends $\frac{1}{3}$ on a game and $\frac{1}{4}$ on food, leaving £15. Shade the bar, then solve an equation for x .

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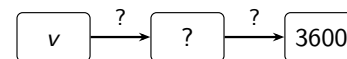
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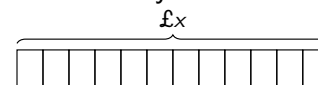
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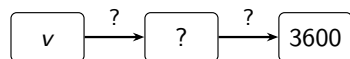
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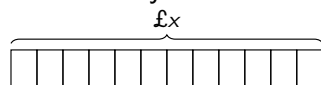
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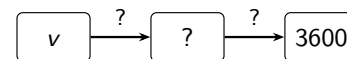
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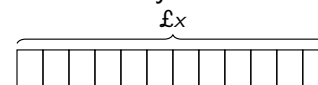
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Starter 6: Simultaneous Equations

Two receipts

2 coffees 3 cakes	2 coffees 1 cake
Total £9.30	Total £5.50

£P at £/ simple interest a year

Years	2	5
Balance	£560	£650

Two bureaux de change

Airport: no fee, and €1.10 for every £1.

High Street: a £5 fee, then €1.20 for every £1 that is left.

- 0.125 as a fraction
- $2^{-1} + 2^{-2}$ as a percentage
- Write each receipt as an equation, with c for a coffee and k for a cake. Subtract to find k and c .
- Solve each pair of equations.
 - $x + y = 10$
 - $2x + 3y = 13$
 - $x - y = 4$
 - $x + y = 5$
- Write two equations from the table, and solve them. Find the interest rate.
- Write the euros, y , that each bureau gives for £ x . When are they equal?
- (Challenge) Solve $2^x \times 2^y = 64$ and $3^x \div 3^y = \frac{1}{9}$.

Starter 6: Simultaneous Equations

Two receipts

2 coffees 3 cakes	2 coffees 1 cake
Total £9.30	Total £5.50

£P at £/ simple interest a year

Years	2	5
Balance	£560	£650

Two bureaux de change

Airport: no fee, and €1.10 for every £1.

High Street: a £5 fee, then €1.20 for every £1 that is left.

- 0.125 as a fraction
- $2^{-1} + 2^{-2}$ as a percentage
- Write each receipt as an equation, with c for a coffee and k for a cake. Subtract to find k and c .
- Solve each pair of equations.
 - $x + y = 10$
 - $2x + 3y = 13$
 - $x - y = 4$
 - $x + y = 5$
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