

ACTIVE MATHS



Australian Curriculum edition

SAMPLE PAGES

Homework Program

Monique Miotto
Tracey MacBeth-Dunn



ACTIVE MATHS 2

Australian Curriculum edition

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Homework Program

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Record sheet

Name:

Due Date:/...../.....

			TEACHER FEEDBACK					
			Skill sheet 1	Skill sheet 2	Skill sheet 3	Skill sheet 4	Investigation	Technology task
1	Chance	1	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>
2	Data	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
3	Decimal numbers	17	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
4	Fractions	25	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
5	Geometry	33	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
6	Integers	43	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
7	Linear equations	51	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
8	Linear graphs	59	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
9	Measurement	67	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Number theory	79	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
11	Patterns and algebra	87	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
12	Percentages	97	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
13	Ratio and rates	105	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
14	Transformations	113	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
15	Whole numbers	123	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE PAGES

Linear equations 1

Name:

Due date:/...../.....

1 Circle the algebraic expression.

[Expression]

$3x + 1 \qquad 2y = 4$

2 An equation always contains an equals sign. True or false?

[Equation]

3 If $y = 2x + 4$, find y when $x = 3$.

[Substitution]

4 If $m = 2a$, find m when $a = 3$.

[Substitution]

For **5–6**, write ‘Yes’ or ‘No’.**5** Is $m = 2$ the solution to $4m - 5 = 5$?

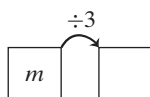
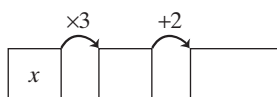
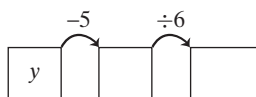
[Substitution]

6 Is $a = 17$ the solution to $3a - 1 = 50$?

[Substitution]

7 Is $y = 0$ the solution to $\frac{5 - 2y}{5} = 2$?

[Substitution]

For **8–10**, build the expression by completing the flow chart.**8**
[Build expression]**9**
[Build expression]**10**
[Build expression]For **11–25**, solve the equation using the method indicated by your teacher. Make sure you check your solution.

11 $x - 5 = 8$

[Solve 1-step]

12 $5m = 45$

[Solve 1-step]

13 $\frac{y}{8} = 3$

[Solve 1-step]

14 $6 + a = 8$

[Solve 1-step]

15 $m + 3\frac{1}{2} = 4$

[Solve 1-step]

16 $4a = 20$

[Solve 1-step]

17 $\frac{x}{2.1} = 5$

[Solve 1-step]

18 $\frac{y}{10} = \frac{1}{2}$

[Solve 1-step]

19 $4g = 6.2$

[Solve 1-step]

20 $2x - 4 = 8$

[Solve 2-step]

21 $\frac{3m}{5} = 2.6$

[Solve 2-step]

22 $3 + 2m = 4$

[Solve 2-step]

23
[Solve 2-step]

$$\frac{y}{2} + 8 = 16$$

24
[Solve 2-step]

$$\frac{5+m}{3} = 2.4$$

25
[Solve 2-step]

$$23 + 2n = 41$$

26
[Solve 2-step]

Solve $\frac{m-2}{6} = 8$ by doing the same
to both sides. Make sure you check your
solution.

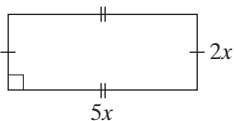
For **27–30**, write an equation and solve it to answer
the question. Make sure you check your solution.

27
[Equation
application]

The sum of a number, n , and 4 is 17.
What is the number?

28
[Equation
application]

If the perimeter is 42 cm, what is the
value of x ?



29
[Equation
application]

If p is the cost of a pen and 5 pens cost
\$2.10, how much does each pen cost?

30
[Equation
application]



A number, n , is divided by 2 and then
5 is added. The answer is $8\frac{1}{2}$. What is
the number?

Student comment	Guardian comment/signature	Teacher feedback

Linear equations 2

Name:

Due date:/...../.....

For 1–3, write ‘Yes’ or ‘No’.

1 Is $x = 3$ the solution to $4(x - 2) = 20$?

[Complex substitution]

2 Is $y = 1$ the solution to $7y - 4 = 2y + 1$?

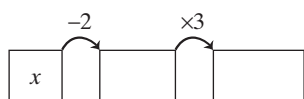
[Complex substitution]

3 Is $m = -5$ the solution to $4 - 2m = 14$?

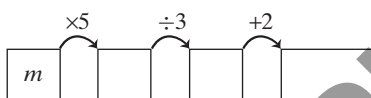
[Complex substitution]

For 4–7, build the expression by completing the flow chart.

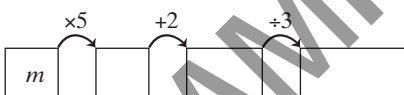
4
[Build expression]



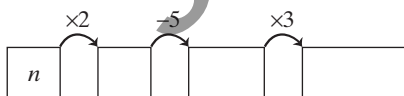
5
[Build expression]



6
[Build expression]



7
[Build expression]



For 8–22, solve the equation using the method indicated by your teacher. Make sure you check your solution.

8 $5 + 2x = 13$

[Solve 2-step]

9 $4(x - 2) = 40$

[Solve brackets]

10

[Solve brackets]

$$3(5 + y) = 12$$

11

[Solve brackets]

$$3(2n + 4) = 12$$

12

[Solve brackets]

$$4(x + 3) - 5 = 19$$

13

[Solve brackets]

$$5(a - 1) + 2(a + 3) = 22$$

14

[Solve brackets]

$$4m + 2(3m - 1) = 18$$

15

[Solve fraction]

$$\frac{4y - 2}{5} = 2$$

16

[Solve fraction]

$$\frac{2x}{7} - 4 = 6$$

17

[Solve 2-step]

$$5x - 2 = 10$$

18

[Solve brackets]

$$4(2 + 3m) = 15$$

19

[Solve fraction]

$$\frac{2x - 3}{4} = 3$$

20

[Solve fraction]

$$\frac{2m}{3} + 8 = 5$$

21

[Solve fraction]

$$\frac{2x - 3.8}{4} = 0.6$$

22

[Solve negative]

$$10 - y = 15$$

23[Solve
negative]

$$-3m + 4 = 16$$

24[Solve
fraction,
negative]

$$\frac{7-m}{3} = -2$$

25[Solve
fraction,
negative]

$$7 - \frac{m}{3} = -2$$

26

$$6(5-a) = 2.4$$

[Solve
brackets]

27Solve $6a - 5 = 19 + 2a$ by doing the same thing to both sides.[Solve
pronumeral
both sides]

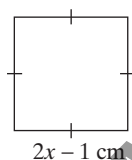
For **28–30**, write an equation and solve it to answer the question. Make sure you check your solution.

28[Equation
application]

If I add 7 to a number, n , and then double the result, I get 36. What is the number?

29[Equation
application]

The perimeter is 24 cm. What is the value of x ?

 $2x - 1 \text{ cm}$

30[Equation
application]

If you add 4 to Ben's age and double it you get Emily's age. If the sum of their ages is 41, how old is Ben?

Student comment	Guardian comment/signature	Teacher feedback

Just solve it!

Name:

Due date:/...../.....

You have probably wondered why we spend so much time learning how to write steps for solving equations when you can solve many of them in your head. In this task we will explore how flowcharts, 'doing the same to both sides', 'guess, check and improve' and substitution fit together in 'the big picture', which is, of course, solving puzzles. That's what mathematicians love to do!

1

[Work mentally]

You can think of an equation like $2x + 1 = 5$ as a fancy-looking number puzzle: $2 \times \boxed{?} + 1 = 5$. We have just called the mystery number x . Solve this puzzle *mentally*, and then check your answer. Are you convinced that you are correct?

Now solve the following equations mentally and check your answers by substitution.

a $x + 1 = 4$ $x = \underline{\hspace{2cm}}$

b $3y = 24$ $y = \underline{\hspace{2cm}}$

c $3a + 4 = 25$ $a = \underline{\hspace{2cm}}$

d $\frac{x}{6} = 2$ $x = \underline{\hspace{2cm}}$



e $\frac{c}{3} + 1 = 7$ $c = \underline{\hspace{2cm}}$



f $\frac{2w}{6} = 5$ $w = \underline{\hspace{2cm}}$

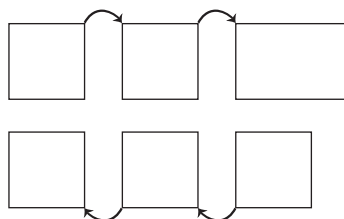
**2**

[Work backwards]

[Communicate your results]

Everyone solves puzzles differently, so you need to be able to communicate your method to other people. It helps if your work is in some kind of order. *Backtracking* or *making a flowchart* is an orderly way of writing down the mental steps in solving an equation.

Use the flow chart below to solve $2x + 1 = 5$ for x .



3

[Work
backwards]
[Communicate
your results]

In *doing the same to both sides* you are also writing down the mental steps in solving an equation. When using this method, some mathematicians like to show more detail than others. Take our original puzzle, $2x + 1 = 5$.

Solution	Thinking
$2x + 1 = 5$	If 2 times a mystery number plus 1 is 5,
$2x = 4$	then 2 times that mystery number must be 4,
$x = 2$	and that mystery number must be 2.

Write the steps in solving the equation $3x + 4 = 25$ in the space below.

4

[Guess,
check and
improve]

When they can't see an obvious way to solve an equation, mathematicians can use the *guess, check and improve* method. For example, how would you solve the linear equation $x^2 + 10 - 7x = 0$ for x ? Two guesses are shown in the table below.

Guess	LHS: $x^2 + 10 - 7x$	RHS	Comment
$x = 0$	$0 \times 0 + 10 - 7 \times 0 = 10$	10	Too high
$x = 1$	$1 \times 1 + 10 - 7 \times 1 = 4$	4	Closer, but still too high

Using pencil, improve on these guesses until you find a solution.

5

Substitution is another name for checking (or verifying) your answers (or solutions). No matter how you solve an equation, you need to have a way of knowing whether you are correct.

Use substitution to check your mental solution (from question 1c) to the equation $3a + 4 = 25$.

Sub. $a =$ _____ into $3a + 4 = 25$:

6



[Explore
other
possibilities]

Some equations have more than one solution. There are actually two solutions to the equation $x^2 + 10 - 7x = 0$ that you have just solved. (This is often the case with equations that have an x^2 term.) Keep using 'guess, check and improve' in the table above until you find the other solution.

Student comment

Guardian comment/signature

Teacher feedback

The cake stall

Name:

Due date:/...../.....

Your class is running a cake stall as a fundraiser. You need to set the prices of the cakes to ensure you make a reasonable profit after all costs are taken into account. How can you do this? How many cakes do you need to sell? What happens if you change the prices? You can answer these questions easily using Microsoft Excel and your knowledge of equations.

- 1** Let's begin by writing an equation for the money that can be made in sales. Let c represent the number of cakes sold.

- a** If you charge \$5 for each cake, complete this equation:

Sales (\$) = _____

- b** If you sold 20 cakes, how much would you earn in sales?



- 2** Now let's consider the costs of running the stall. Suppose it costs \$50 to hire the tables and a marquee. All the cake ingredients are donated.

- a** Complete this equation: Costs (\$) = _____
b What are the costs if you make and sell 20 cakes?

- 3** Using Excel, we can experiment with cake numbers to determine the stall's profit. Equations and expressions are called formulas in Excel. To enter a formula, type = in a cell. Use * for multiply. Instead of typing pronumerals, use cell names where the values are stored; for example, cell B3 for the number of cakes. Clicking on a cell will enter its name in a formula.

- Open a new spreadsheet and set up the following table.

	B	C	D	E
2	Number of cakes, c	Costs (\$)	Sales (\$)	Profit (\$)
3				
4				


- If the number of cakes is shown in cell B3, write your equations for costs and sales in cells C3 and D3.
- Enter a formula for profit in cell E3. Remember that the profit is the difference between sales and costs.
- Use your spreadsheet to calculate the costs, sales and profit if you sell 20 cakes. Check that the costs and sales amounts agree with your answers to questions **1** and **2**.

How much profit would you make? _____

4

[To format the cost, sales and profit columns for dollars and cents, highlight these columns, open the **Number** menu and set the number format to 'Currency'.]

Now, let's experiment with cake numbers for different situations.

- Use the fill handle  to copy down the formulas in C3, D3 and E3 as needed.
- Produce a table showing profits or losses for sales in the range 1 cake to 25 cakes.

- What is the profit or loss if you sell only 5 cakes? _____
- How many cakes do you need to sell to break even? _____
- How many cakes do you need to sell to make a profit of \$70? _____

Try this!

You have decided that the price you intended to charge was too low. You change the price of cakes to \$10. Adjust your spreadsheet to reflect the new price. Find the new profits or losses for sales in the range 1 cake to 25 cakes. If possible, print out your table and paste it in the space below. How many cakes would you need to sell to make a profit of \$100?

SAMPLE PAGES

Student comment	Guardian comment/signature	Teacher feedback