

- 1 Find the value of  $a$ , the value of  $b$  and the value of  $c$  so that this identity is true for all values of  $x$  and  $y$ .

$$3x + ay + 7 + bx + a \equiv x + 7y + c$$

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots$$

$$c = \dots\dots\dots \mathbf{[3]}$$

2 (a) Find the coordinates of the midpoint of the line joining the points (5, 2) and (-3, 7).

(a) ( ..... , ..... ) [2]

(b) (i) For  $d = 6t^2 + 4$ , find the value of  $d$  when  $t = -3$ .

(b)(i) ..... [2]

(ii) Rearrange this formula to make  $t$  the subject.

$$d = 6t^2 + 4$$

(ii) ..... [3]

(c) Write a **number** in each box so that the following is an identity.

$$4x - 3 + 6(x - 5) \equiv 7x - 1 + \square x - \square \quad [2]$$

(d) You are given that  $f(x) = 5 - 2x$ .

(i) Find  $x$  when  $f(x) = 0$ .

(d)(i) ..... [1]

(ii) Find  $f(t + 4)$ .  
Express your answer in the form  $a + bt$ .

(ii) ..... [2]

3 Maja and Charlie are playing a 'think of a number' game.

(a) Maja says:

I think of a number.  
I add 4.  
I multiply the result by 6.  
The answer is 72.

Find the number that Maja thought of.

(a) \_\_\_\_\_ [2]

(b) Charlie says:

I think of a number.  
I multiply it by 6.  
I add 4 to the result.  
The answer is 39 more than the number I first thought of.

(i) Let  $n$  be the number that Charlie first thought of.

Complete this equation for Charlie's number game.

\_\_\_\_\_ =  $n + 39$  [1]

(ii) Solve the equation to find the number that Charlie first thought of.

(b)(ii) \_\_\_\_\_ [3]

- 4 (a) You are given this identity

$$5x + 3(2x - 7) \equiv ax + b$$

where  $a$  and  $b$  are integers.

Find the values of  $a$  and  $b$ .

(a)  $a =$  \_\_\_\_\_

$b =$  \_\_\_\_\_ [2]

- (b) You are given this equation

$$5x + 3(2x - 7) = cx + d$$

where  $c$  and  $d$  are integers.

You are given also that this equation has solution  $x = 4$  and is **not an identity**.

Find a possible pair of values of  $c$  and  $d$ .

(b)  $c =$  \_\_\_\_\_

$d =$  \_\_\_\_\_ [2]

- 5 Decide whether each of the following is an equation, a formula, an identity or an expression. For each one, put a tick (✓) in the correct column.

	Equation	Identity	Formula	Expression
$V = \frac{1}{3}\pi r^2 h$				
$3n + 5 + 5n - 7 \equiv 8n - 2$				
$6n - 4 = 2n$				
$\pi r^2$				
$7t^2 - t + 11$				

[4]

6 At a fish and chip shop, a fish costs £3.32 and a portion of chips costs £1.24.

- (a) Sameira buys  $x$  fish and 6 portions of chips.  
She pays £34.

Use this information to write down an equation in  $x$  and solve it to find how many fish Sameira buys.

(a) \_\_\_\_\_ [4]

- (b) When Sameira goes to the fish and chip shop the following week, all prices have been increased by 12%.

How much will she have to pay in total if she buys one fish and one portion of chips?

(b) £ \_\_\_\_\_ [3]

7 Solve.

(a)  $10x - 7 = 2x + 3$

(a) \_\_\_\_\_ [3]

(b)  $7(5 - 2x) = 0$

(b) \_\_\_\_\_ [3]



8 (a) Solve.

(i)  $3x + 7 = 15 - 2x$

(a)(i) \_\_\_\_\_ [3]

(ii)  $\frac{8}{x} = 2$

(ii) \_\_\_\_\_ [1]

(iii)  $3x^2 = 75$

(iii) \_\_\_\_\_ [3]

(b) Expand.

$$4x(2x - 7)$$

(b) \_\_\_\_\_ [2]

(c) Factorise.

$$6 + 8x$$

(c) \_\_\_\_\_ [1]

(d) Make  $x$  the subject of the following.

$$x + 3 = 2a + bx$$

(d) \_\_\_\_\_ [4]