border, and be centred in the middle of the side. Shade it grey. (5) Draw two more grey triangles, one on each side of the white border.

Chapter 8

8.1 Exploring Pattern Representations

1. a) The missing values are 3, 6, 9, 12, and 15.
b) Start from 3. Add 3 to each value to get the next term value. An alterative rule could be: multipy the term number by 3.
2. a) The missing values are 1, 3, 4, 6, and 7.
b) Start from 1. Add 2, then add 1, then add 2, then add 1, and so on. An alternative rule could be: Add 0, 1, 1, 2, 2, and so on, to the term numbers to get the term values.
3. b) For the 10th term, there are 30 squares in total, and 15 shaded squares.

8.2 Using Variables to Write Pattern Rules

1. a) The number of shaded squares stays the same. The number of white squares changes.
b) Start with two shaded squares and one white square. Add one white square each time. An alternative rule could be: the total number is equal to 2 plus the term number.
c) $2 + b$, where b is the term number
2. a) The missing values are 2, 4, 6, 8, and 10.
b) The number of circles is equal to the term number multiplied by 2.
c) $2c$, where c is the figure number (also called the term number)
3. a) Omar sees that the number of squares stays the same: 2. He also sees that the number of triangles is equal to the term/figure number (n) plus 1, or $n + 1$. To find the total number of blocks, Omar adds the number of squares to the number of triangles and gets $2 + (n + 1)$.
b) Tynessa notices that the total number of blocks is equal to the term/figure number (n) plus 3. She gets $3 + n$.
4. a) $4 + s$ **b)** $4t$ **c)** $3c + 1$
5. a) n **b)** $3n$ **c)** $n + 3n$, or $4n$
6. a)

Figure number	1	2	3	4	5	…	10
Number of white squares	1	2	3	4	5		10
Number of shaded squares	8	10	12	14	16		26

b) $2n + 6$
c) $3s + 6$

8.3 Creating and Evaluating Expressions

1. a) 9, 10, 11, 12 **b)** 8, 16, 24, 32
c) 7, 6, 5, 4 **d)** 12, 6, 4, 3
e) 5, 7, 9, 11
2. a) 10 **b)** 18 **c)** 4 **d)** 6
e) 7 **f)** 12 **g)** 0 **h)** 9
3. a) \$17.50 **b)** \$1.75
4. a) \$21 **b)** \$102
5. a) \$65 **b)** \$35 **c)** \$20
6. a) $2c$ **b)** $10p + 2$ **c)** $35j - 10$
7. a) $20s + 5$ **b)** \$65 **c)** \$205
8. $3(x + 4) = 3(5 + 4) = 3(9) = 27$
9. a) $2p + 1$ **b)** 3 km **c)** 9 km

8.4 Solving Equations by Inspection

1. a) 5 **b)** 3 **c)** 2
d) 11 **e)** 2 **f)** 5
2. a) $4t - 8 = 4(2) - 8 = 0$; Ravi's solution is incorrect.
b) $t = 6$
3. a) $2t + 1$
b) $2t + 1 = 15$
c) $t = 7$
d) The figure number is $t = 10$.

8.5 Solving Equations by Systematic Trial

1. a)

Predict y.	Evaluate $y + 5$.	Is this the correct solution?
5	$5 + 5 = 10$	too low
10	$10 + 5 = 15$	too high
7	$7 + 5 = 12$	correct

b)

Predict m.	Evaluate $3m$	Is this the correct solution?
200	$3(200) = 600$	too high
150	$3(150) = 450$	too high
111	$3(111) = 333$	correct

c)

Predict r.	Evaluate $5r - 10$.	Is this the correct solution?
15	$5(15) - 10 = 65$	too low
21	$5(21) - 10 = 95$	correct
25	$5(25) - 10 = 115$	too high

2. a) $x = 64$ **b)** $q = 116$ **c)** $w = 17$ **d)** $c = 12$
e) $e = 7$ **f)** $k = 27$ **g)** $s = 51$ **h)** $u = 31$

3. a) $4x + 100 = 140$, $x = 10$
b) $7x = 294$, $x = 42$
c) $4x - 52 = 212$, $x = 66$

4. a) She multiplied $(24 + 12)$ by the variable. The equation asked for multiplying the variable by 12 only, and then adding 24.
b)

Predict z.	Evaluate $24 + 12z$.	Is this the correct solution?
10	$24 + 12(10) = 144$	too low
15	$24 + 12(15) = 204$	too high
13	$24 + 12(13) = 180$	correct

5. a) $A = 6$ units squared
b) $h = 4$ units
c) $b = 8$ units

8.6 Communicating the Solution for an Equation

1. On the left side there are three containers, so you get $3c$. On the right side there are 15 marbles. The equation is $3c = 15$. Divide both sides of the equation by 3, to determine that $c = 5$. The answer means that each container holds five marbles.

2. a) $5c = 10$, $c = 2$ **b)** $c + 3 = 7$, $c = 4$
c) $4c + 5 = 13$, $c = 2$

3. On the left side, there are two containers and three marbles. You can write this as $2m + 3$. On the right side there are five marbles. The equation is $2m + 3 = 5$. Subtract 3 from both sides to get $2m = 2$. Divide both sides by 2 to get $m = 1$.

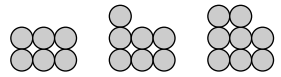
4. Tynessa should have subtracted 6 from both sides before dividing both sides by 2. The correct solution is $c = 3$.

Test Yourself

1. a) Start with one square and one triangle. Add one triangle each time. An alternative rule is: Each figure has one square and the same number of triangles as the term number.
b) $t + 1$

2. a) $3b$ **b)** $3 + b$ **c)** $(1 + t) + 1$, or $2 + t$

3. a)



b)

c)

d)

4. a) 9 **b)** 14 **c)** 2 **d)** 10

5. a) $15 + h$ **b)** \$40 **c)** \$115

6. a) $x = 12$ **b)** $p = 9$ **c)** $m = 2$ **d)** $b = 6$

7. a) $4 + t$ **b)** $4 + t = 16$
c) $t = 12$ **d)** $4 + (12) = 16$

8.

Predict k.	Evaluate $4 + 2k$.	Is this the correct solution?
50	$4 + 2(50) = 104$	too low
52	$4 + 2(52) = 108$	too high
51	$4 + 2(51) = 106$	correct

9. a) $3c = 9$
b) $c = 3$
c) There are three containers on the left side and nine marbles on the right, so the equation is $3c = 9$. Divide both sides by 3 to get $c = 3$.

10. a) $x = 5$ **b)** $x = 3$ **c)** $x = 4$ **d)** $x = 4$

Chapter 9

9.1 Adding Fractions with Pattern Blocks

1. To show $\frac{1}{4}$ of each diagram, shade one section of the square, one section of the circle, and two sections of the rectangle.

2. For example, you could draw a rectangle divided in five equal pieces, and shade two.

3. a) To show $\frac{1}{6}$, shade one section.