

Number sequences Page 8

Ruby

- 1 Add 25
- 2 Add 1,000
- 3 Add 7
- 4 918, 945
- 5 680, 720
- 6 252

Pearl

- 1 Add 1,000
- 2 Minus 10
- 3 Minus 100
- 4 6,789, 7,089
- 5 13,678, 12,678
- 6 109,078, 119,078

Diamond

- 1 This is only sometimes true. If you count in steps of 1,000 from any multiple of 1,000 then the last digits will always end in 3 zeros but not if you count on from any other number e.g. 1,249, 2,249, 2,249 ...
- 2 Possible sequence, for example: 15,678, 14,678, 13,678, 12,678, 11, 678.
- 3 Sam is incorrect the difference between two consecutive terms in the sequence is 100 not 102.

Place value Page 9

Ruby

- 1 7 thousands (7,000)
- 2 7 ones (7)
- 3 7 thousands (7,000)
- 4 8,000, 2
- 5 50,000, 40
- 6 9,000, 400

Pearl

- 1 2 thousands (2,000)
- 2 2 hundred thousands (200,000)
- 3 2 tens (20)
- 4 2 ten thousands (20,000) or 20 thousands
- 5 700,000, 4,000
- 6 10,000, 500

Diamond

- 1 Agree. $706,542 > 43,598$ but the value of the digit 5 is equivalent to 500 in both the numbers.
- 2 876,541, 145,678
- 3 For example, 7,625, 695, 81,695, 92,615
92,615 is the largest number as it the digit 9 in the ten thousands place value column (90,000).
The answer will depend on the pupil's set of numbers.
- 4 3,257, 3,275, 3,572, 3,527, 3,725, 3,752, 2,735, 2,753, 2,357, 2,375, 2,537, 2,573

Ordering whole numbers Page 10

Ruby

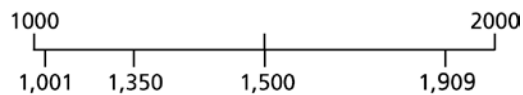
- 1 5,766
- 2 3,265
- 3 8,996
- 4 3,905, 3,902, 3,891, 3,457, 3,456
- 5 7,903, 7,452, 7,254, 7,001
- 6 59,101, 55,674, 55,672, 45,545

Pearl

- 1 6,987, 66,302, 66,897, 600,984, 606,321
- 2 22,789, 201,096, 201,158, 210,156, 210,187
- 3 50,095, 50,654, 500,876, 504,109, 504,526
- 4 $876,439 > 806,433$
- 5 $776,099 < 779,099$
- 6 $541,321 > 504,409$

Diamond

1



- 2 Yes. The largest 6-digit number is 999,999 which is less than 1,000,000.
- 3 8,139, 8,193, 8,139, 8,391, 8,913, 8,931

Roman numerals Page 11

Ruby

- 1 60
- 2 89
- 3 65
- 4 XXV
- 5 XXXVIII
- 6 LXXII

Pearl

- 1 356
- 2 450
- 3 270
- 4 CCCLXXX
- 5 CCCXCIX
- 6 DCIII

Diamond

- 1 XC = 90, so it is less than 999.
- 2 Yes, IX means 1 less than 10, **or** Yes, IX is equal to 9.
- 3 2000, 1992, 2004, 2006, 1994, 2002. Her order is incorrect.
- 4 CCLIX is equal to 259 rounded to the nearest 100 is 300.

Rounding Page 12

Ruby

- 1 9,570, 9,600, 10,000
- 2 4,450, 4,500, 4,000
- 3 2,770, 2,800, 3,000
- 4 6,560, 6,600, 7,000
- 5 55,460, 55,500, 55,000
- 6 11,660, 11,700, 12,000

Pearl

- 1 987,480, 987,500, 987,000
- 2 674,900, 674,900, 675,000
- 3 875,800, 875,800, 876,000
- 4 180,000 and 200,000
- 5 260,000 and 300,000
- 6 100,000 and 100,000

Diamond

- 1 **a** 4,315 **b** 4,324
- 2 550
- 3 5,049

If I arrange the digits 5, 9, 0 and 4, I can make the numbers: 5,905; 5,409; 5,049; 4,905; 4,950; 4,590; 4,509; 9,504; 9,045; 9,054; 9,405. However the closest possible number to 5,000 is 5,049.

Negative numbers **Page 13****Ruby**

- 1** -10, -15, -20
- 2** 0, -10, -20
- 3** 25, 0, -25
- 4** -8, -10, -12
- 5** 7
- 6** 17

Pearl

- 1** 5 °C
- 2** 18 °C
- 3** 15 °C
- 4** 30 °C
- 5** 5 °C
- 6** 5 °C

Diamond

- 1** Disagree, as $-4 + 6$ will be 2°C .
- 2** Agree. If temperature drops 2°C per day, $2^{\circ}\text{C} \times 7 = 14^{\circ}\text{C}$ so the temperature will drop from 7°C to -7°C .
- 3** 1 and -4, 2 and -3, 3 and -2, 4 and -1

Addition Page 14**Ruby**

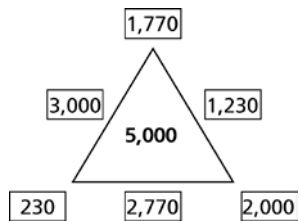
- 1 a 599 b 1,011 c 5,789
2 399 football stickers
3 7,799

Pearl

- 1 25,999
2 35,839
3 24,098
4 <
5 <
6 <

Diamond

- 1 No it is not always true. For example, $8,853 + 4,256 = 13,109$.
2



Subtraction Page 15

Ruby

- 1 **a** 460 **b** 279 **c** 4,127
- 2 213 spaces
- 3 £3,068

Pearl

- 1 33,232
- 2 12,346
- 3 352
- 4 <
- 5 =
- 6 =

Diamond

- 1 7,918 litres
- 2 10,767
- 3 9 6 2 9
 — 5 7 9 6
 3 8 3 3
- 4 £11,248

Multiples and factors**Page 16****Ruby**

- 1 24, 28, 32, 36
- 2 40, 48, 56, 64
- 3 300, 350, 400, 450
- 4 5×3 , 15×1
- 5 9×2 , 3×6 , 18×1
- 6 1×24 , 3×8 , 6×4 , 12×2

Pearl

- 1 35, 40, 45, 50, 55, 60, 65, 70, 75
- 2 12, 24, 36, 48, 60, 72, 84, 96
- 3 18, 54
- 4 4, 8
- 5 $(3p \times 3) + (8p \times 8)$
- 6 One of each

	Multiple of 5	Not a multiple of 5
Factor of 120	120, 60, 40, 30, 20, 15, 10, 5	24, 12, 8, 6, 4, 3, 2, 1
Not a factor of 120	25 (any multiple of 5 except as above)	48 (any number except those shown above or left)

Diamond

- 1 Yes. 63 divided by 7 = 9, so 7 is a factor of 63.
- 2 True. The units digits follow a repeating pattern: 6, 2, 8, 4, 0 ...
6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84
- 3 No not true.
7, 14, 21, 28, 35, 42
- 4 Agree. Factors of 24 are 1, 2, 3, 4, 6, 8 and 12.
Factors of 30 are 1, 2, 3, 5, 6, 10, 15 and 30.
So the common factors are: 1, 2, 3 and 6.

Prime numbers **Page 17****Ruby**

1 2, 3, 5, 7, 11, 13, 17, 19

2 For example:

2

3

14

15

Pearl

1 **a** 7, 11 **b** 13, 23

2 Three from: 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

3 **a** 2, 3 **b** 2, 7

Diamond

1 Yes. 1 is not a prime number, because for a number to be prime it must have exactly two, different, factors.

2 $7 \times 3 \times 5$

3 No this is not true. 2 is a prime number and is an even number.

4 Always true. All prime numbers greater than 3 are 1 more or 1 less than a multiple of 6.

Square and cube numbers Page 18

Ruby

- 1 9
- 2 4, 25
- 3 36
- 4 8
- 5 64
- 6 1, 125

Pearl

- 1 4
- 2 25
- 3 36
- 4 64
- 5 8
- 6 27

Diamond

- 1 11 cm
- 2 Possible answer: $10^2 + 6^2 + 2^2$
- 3 Yes, it is true.
The first five square numbers = 1, 4, 9, 16, 25 = 55
5 groups of 11 = 55
- 4 10
- 5 1 is a cubed number because $1 \times 1 \times 1 = 1$

Multiply and divide by 10, 100 or 1,000 **Page 19****Ruby**

- | | | | | |
|----------|----------|-----|----------|------|
| 1 | a | 60 | b | 600 |
| 2 | a | 270 | b | 2700 |
| 3 | a | 30 | b | 300 |
| 4 | a | 0.8 | b | 0.08 |
| 5 | a | 3.4 | b | 0.34 |
| 6 | a | 7.8 | b | 0.78 |

Pearl

- | | |
|----------|---------|
| 1 | 3420 |
| 2 | 7145 |
| 3 | 802,100 |
| 4 | 274.8 |
| 5 | 2.3595 |
| 6 | 0.61478 |

Diamond

- | | |
|----------|---|
| 1 | Yes. $7 \times 100 = 700$, $70 \times 10 = 700$ |
| 2 | No. 4567 divided by 1000 = 4.567
5,799 divided by 1000 = 5.799, but 4000 divided by 1000 = 4 |
| 3 | £106 = 10,600 pennies |
| 4 | a 67,230 b 0.5498 |

Short multiplication Page 20

Ruby

1

×	2	3	4	5	6	7	8
6	12	18	24	30	36	42	48
7	14	21	28	35	42	49	56
8	16	24	32	40	48	56	64
9	18	27	36	45	54	63	72

2 a 216 b 567

3 a 2880 b 3100

Pearl

1

×	132	367	908
6	792	2,202	5,448
7	924	2,569	6,356
8	1,056	2,936	7,264

2 $5,243 \times 3 = 15,729$

3 9,675 nails

4 6,270 toys

Diamond

1 2,653

2 Yes. $1,395 \times 6 = 8,370$ g, which is less than $10 \text{ kg} = 10,000$ g.

3 $54 \times 63 = 3,402$

Long multiplication Page 21**Ruby**

- 1** **a** 224 **b** 336
2 **a** 19,436 **b** 65,184 **c** 21,775

Pearl

- 1** **a** 73,282 **b** 198,625 **c** 269,973
2 1,716 calories
3 £141,264

Diamond

- 1** Yes. $365 \times 24 = 8,760$, so this is less than 10,000 hours in one year.
2 No. $454 \times 35 = 15,890$ and $908 \times 70 = 63,560$.
3 $84 \times 62 = 5,208$ or $82 \times 64 = 5,248$.

Short division Page 22

Ruby

1 a 81 b 41 c 38

2 a-c

×	5
72	360
93	465
29	145

Pearl

1 a 293 b 606

2 a False. 621 divided by 9 = 69. b True. 714 divided by 7 = 102.

3 78 seeds

4 132 books

Diamond

1 Yes. 1,425 divided in to 5 equal bar sizes = 285.

2 42×9 or 63×6 or 54×7

3 Dev is incorrect. For example, 1,220 divided by 4 = 305.

1,220 divided by 2 = 610 double by 2 = 1,220. Dev should divide by 2 and then divide by 2 again.

Remainders Page 23

Ruby

- 1 **a** Remainder 1 **b** Remainder 2
 c Remainder 2 **d** Remainder 1
- 2 **a** 0.5 **b** 1 or 0.25

Pearl

- 1 **a** 0.25 or $\frac{1}{4}$ or remainder 1 **b** $\frac{1}{2}$ or 0.5 or remainder 3
 c $\frac{3}{4}$ or 0.75 or remainder 6
- 2 23 buses
- 3 318 bags
- 4 **a** < **b** >

Diamond

- 1 Yes. For example, $699 \div 6 = 116 \text{ r } 3$. The remainder 3 is half of the divisor 6 so can be expressed as 0.5 or $\frac{1}{2}$ or whole number remainder 3.
- 2 5
- 3 Several possible answers:
 $8,965 \div 4 = 2,241.25$
 $9,865 \div 4 = 3,466.25$
 $5,869 \div 4 = 1,467.25$
 $8,569 \div 4 = 2,142.25$
 $5,689 \div 4 = 1,422.25$
 $6,589 \div 4 = 1,647.25$
 $6,985 \div 4 = 1,496.25$
 $9,685 \div 4 = 2,421.25$

Mixed numbers Page 24

Ruby

1 a $\frac{1}{2}$ b $\frac{1}{5}$ c $\frac{3}{8}$

2 Possible answers:

 a $\frac{1}{2} = \frac{2}{4}$ b $\frac{4}{6} = \frac{2}{3}$ c $\frac{1}{1} = \frac{3}{3}$

Pearl

1 a $2\frac{1}{3}$ b $1\frac{3}{5}$ c $1\frac{2}{3}$

2 a $1\frac{2}{6}$ or $1\frac{1}{3}$ b $1\frac{4}{9}$ c $3\frac{6}{7}$

Diamond

1 Possible answers: $\frac{3}{2}$ $\frac{6}{4}$ $\frac{9}{6}$ $\frac{12}{8}$

2 $2\frac{8}{10}$ is the larger fraction. This is because $2\frac{3}{5}$ is equivalent to $2\frac{6}{10}$, which is less than $2\frac{8}{10}$.

3 Yes. The missing fraction is less than one whole so Josh is right, this cannot be a mixed a number. A mixed number is made up of a whole number plus a fractional part.

Comparing fractions Page 25

Ruby

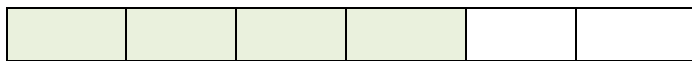
1 a 2nd diagram b 1st diagram

2 a $\frac{2}{4}$ b $\frac{7}{8}$

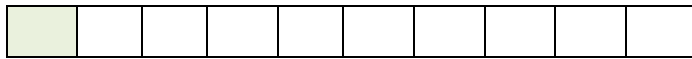
3 a $\frac{2}{8} = \frac{1}{4}$ b $\frac{2}{5} = \frac{4}{10}$

Pearl

1 a $\frac{1}{3} < \frac{4}{6}$



b $\frac{4}{5} > \frac{1}{10}$



2 8

3 a $\frac{4}{5}, \frac{2}{20}, \frac{1}{10}, \frac{3}{40}$ or $\frac{4}{5}, \frac{1}{10}, \frac{2}{20}, \frac{3}{40}$

b $\frac{5}{12}, \frac{2}{6}, \frac{8}{24}, \frac{9}{48}$ or $\frac{5}{12}, \frac{8}{24}, \frac{2}{6}, \frac{9}{48}$

c $\frac{7}{9}, \frac{9}{27}, \frac{1}{3}, \frac{5}{54}$ or $\frac{7}{9}, \frac{1}{3}, \frac{9}{27}, \frac{5}{54}$

Diamond

1 For example, $\frac{3}{5} > \frac{1}{2}$ and $\frac{1}{5} < \frac{2}{3}$

2 Yes. $\frac{3}{15}$ is equal to $\frac{1}{5}$ if you divide the numerator and denominator by 3 and $\frac{4}{20}$ is equal to $\frac{1}{5}$ if you divide the numerator and denominator by 4.

- 3 No, Jacob is incorrect. If you express both fractions with a denominator of 24, then $\frac{3}{8}$ is equivalent to $\frac{9}{24}$, which is larger than $\frac{3}{24}$.

Adding fractions Page 26

Ruby

$$1 \quad \frac{1}{4} + \frac{1}{4} = \frac{2}{4} \text{ or } \frac{1}{2}$$

$$2 \quad \frac{1}{2} + \frac{5}{8} = \frac{4}{8} + \frac{5}{8} = \frac{9}{8} = 1\frac{1}{8}$$

$$3 \quad \frac{4}{6} + \frac{1}{2} = \frac{4}{6} + \frac{3}{6} = \frac{7}{6} = 1\frac{1}{6}$$

$$4 \quad \frac{6}{7} + \frac{3}{7} = \frac{9}{7} = 1\frac{2}{7}$$

$$5 \quad \frac{4}{10} + \frac{9}{10} = \frac{13}{10} = 1\frac{3}{10}$$

$$6 \quad \frac{6}{8} + \frac{5}{8} = \frac{11}{8} = 1\frac{3}{8}$$

$$7 \quad \frac{3}{9} + \frac{7}{9} = \frac{10}{9} = 1\frac{1}{9}$$

Pearl

$$1 \quad \text{a} \quad \frac{8}{10} \text{ or } \frac{4}{5} \quad \text{b} \quad \frac{4}{6} \text{ or } \frac{2}{3} \quad \text{c} \quad \frac{10}{12} \text{ or } \frac{5}{6}$$

$$2 \quad \text{a} \quad 4 \quad \text{b} \quad 3 \quad \text{c} \quad 4$$

Diamond

$$1 \quad \text{Yes. } \frac{1}{6} + \frac{1}{3} = \frac{3}{6} = \frac{1}{2} \text{ so half the field is used for vegetables.}$$

2

$\frac{1}{6}$	$\frac{5}{12}$	$\frac{5}{12}$
$\frac{7}{12}$	$\frac{1}{3}$	$\frac{1}{12}$
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$

Subtracting fractions**Page 27****Ruby**

1 $\frac{5}{8}$

2 $\frac{1}{6}$

3 $\frac{5}{12}$

4 $\frac{3}{9}$ or $\frac{1}{3}$

5 $\frac{6}{10}$ or $\frac{3}{5}$

6 $\frac{5}{8}$

7 $\frac{4}{12}$ or $\frac{1}{3}$

Pearl

1 a $\frac{4}{12}$ or $\frac{1}{3}$ b $\frac{17}{36}$ c $\frac{23}{54}$

2 a 3 b 4 c 1

Diamond

1 $\frac{1}{5} + \frac{1}{3} = \frac{8}{15}$

$1 - \frac{8}{15} = \frac{7}{15}$

So, agree with Sam.

2 $3\frac{10}{12}, 3\frac{6}{12}, 3\frac{2}{12}, 2\frac{10}{12}$ are the first four terms in the sequence.

3 For example, 4 and 2

Multiplying fractions by whole numbers Page 28

Ruby

- 1 15
- 2 24
- 3 27
- 4 16
- 5 30 counters
- 6 He has completed 21 calculations.

Pearl

- 1

<p>a $\frac{28}{8} = 3\frac{4}{8} = 3\frac{1}{2}$</p> <p>c $\frac{12}{15} = \frac{4}{5}$</p>	<p>b $\frac{12}{12} = 1$</p> <p>d $\frac{36}{8} = 4\frac{1}{2}$</p>
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- 2

a 9	b $2\frac{1}{2}$	c $14\frac{2}{3}$	d $15\frac{3}{4}$
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Diamond

- 1 $\frac{4}{6} \times 3 = 2$, $\frac{5}{7} \times 4 = \frac{20}{7} = 2\frac{5}{7}$, so $\frac{5}{7} \times 4$ is larger.
- 2 Disagree. $1\frac{1}{5} \times 7 \text{ days} = 8\frac{2}{5}$
- 3 $2\frac{4}{6} = 2\frac{2}{3}$ and so the bar is drawn correctly. However, he should multiply the bar 6 times rather than 5 as the calculation is $2\frac{4}{6} \times 6$.

Ordering and rounding decimals**Page 29****Ruby**

- 1** **a** £3.05 **b** 7.12 kg **c** 9.01 m
- 2** **a** 5.25 m **b** 8.99 km
- 3** **a** 5 **b** 6 **c** 8 **d** 9 **e** 8

Pearl

- 1** **a** 4.062 **b** 76.464
- 2** **a** 7.6 **b** 3.113
- 3** 6.076, 6.6, 6.716, 6.76
- 4** £6

Diamond

- 1** Ali is almost correct. 8.97 rounded to the nearest whole number is 9. When rounded to one decimal place you write 9.0 (not just 9) to show the number is rounded to one decimal place.
- 2** 9.63
- 3** **a** 3.5 – smallest possible number **b** 4.4 – largest possible number

Percentages Page 30**Ruby**

$$1 \quad \frac{1}{10} = \frac{10}{100} = 10\%$$

$$2 \quad \frac{2}{10} = \frac{20}{100} = 20\%$$

$$3 \quad \frac{3}{10} = \frac{30}{100} = 30\%$$

$$4 \quad \frac{5}{10} = \frac{50}{100} = 50\%$$

$$5 \quad \frac{6}{10} = \frac{60}{100} = 60\%$$

$$6 \quad \frac{7}{10} = \frac{70}{100} = 70\%$$

Pearl

$$1 \quad \text{a} \quad 0.55 \text{ and } \frac{55}{100} \quad \text{b} \quad 0.35 \text{ and } \frac{35}{100} \quad \text{c} \quad 0.12 \text{ and } \frac{12}{100}$$

$$2 \quad \text{a} \quad \text{£}40 \quad \text{b} \quad \text{£}80 \quad \text{c} \quad \text{£}120 \quad \text{d} \quad \text{£}160$$

Diamond

1 Disagree. 15% off £50 is a £7.50 discount, which is not the same as £10.

2 20% off £60 = £12, 15% off £80 = £12

Both discounts are worth £12, so neither is better than the other.

3 Dave did better in the test. 30 out of 100 is the same as 30%, which is higher than Mark's score of 25%.

Fraction, decimal and percentage equivalences Page 31**Ruby**

- 1 0.9
- 2 0.2
- 3 0.7
- 4 0.75
- 5 0.9

Pearl

- 1 $\frac{55}{100}$ and 0.55
- 2 80% and 0.8
- 3 37% and $\frac{37}{100}$
- 4 0.1, 10%
- 5 0.63, $\frac{63}{100}$
- 6 8%, 0.08
- 7 45% or 0.45 or $\frac{45}{100}$

Diamond

- 1 On Monday, because $\frac{16}{20} = 80\%$ (Monday test result) and $\frac{38}{50} = 76\%$ (Tuesday test result).
- 2 Jen is correct. 40% is equivalent to $\frac{40}{100} = \frac{4}{10} = 0.4$ and $\frac{2}{5}$ is the same as $\frac{4}{10}$.
- 3 No Mrs Hicks is not correct. The order should be 65%, $\frac{4}{10}$, 25% and $\frac{20}{100}$.

Time **Pages 32–33****Ruby**

- 1** **a** 10:35 **b** 09:05 **c** 16:15
2 **a** 10:15 a.m. **b** 12:50 p.m. **c** 11:30 p.m. **d** 5:20 p.m.
 e 09:35 a.m. **f** 4:05 p.m. **g** 9:55 p.m.

Pearl

- 1** $90 \times 60 = 5,400$ seconds
2 2 hours 27 minutes
3 2nd July
4 $148 \frac{1}{2}$ hours + 56 seconds
5 18 minutes and 21 seconds
6 **a** True **b** False **c** False **d** True

Diamond

- 1** True
2 False
3 True
4 True
5 False

Money Pages 34–35

Ruby

- 1 £6.20
- 2 £4.40
- 3 £6
- 4 £1.90
- 5 £7.40
- 6 £10.40
- 7 £8.20
- 8 £2.20
- 9 £12.90
- 10 £18.20

Pearl

- 1 £8.14
- 2 £4.33
- 3 £5.44
- 4 £11.35
- 5 £9.04
- 6 £7.26
- 7 £7.10
- 8 £5.02

Diamond

- 1 False. It costs 12p.
- 2 False. You get 5 × as many text for less than double the price.
- 3 False. Lisa's phone bill will be more than £20.
- 4 True. Red tariff $\pounds 12/100 = 12\text{p}$, Yellow tariff $\pounds 20/500 = 4\text{p}$, Blue tariff $\pounds 30/1000 = 3\text{p}$.
- 5 True. Ben's phone bill will be less than £15. It will be £12.00.

Length **Pages 36–37****Ruby**

- 1** **a** 3 m **b** 20 cm **c** 6,000 m
- 2** **a–d** Learners to mark measurements on scale to the nearest 1 mm accuracy.
- 3** 15 cm
- 4** 2,500 m
- 5** 600 cm

Pearl

- 1** 0.35 metres
- 2** 1.25 metres
- 3** **a** 1,700 cm **b** 640 mm **c** 120,000 m
- 4** 15.28 m
- 5** 3.1 km or 3,100 m
- 6** 17,200 m or 17.2 km

Diamond

- 1** They are all incorrect. 0.2 m is equal to 200 cm, which is less than 250 cm.
- 2** No. 4.6 km is equal to 4,600 m, as there are 1,000 metres in a kilometre.
- 3** Disagree. Joe can make 11 complete chicken pens.
4.2 m = 420 cm
420 cm × 10 pens = 4,200 cm
5,000 cm – 4,200 cm = 800 cm, so there is still enough wire to make one more pen:
800 cm – 420 cm = 380 cm
- 4** 6 ways.
3 pieces of 65 cm, 5 pieces of 39 cm, 13 pieces of 15 cm, 15 pieces of 13 cm, 39 pieces of 5 cm, or 65 pieces of 3 cm.
- 5** Max is 16 cm taller than Joe.

Mass **Pages 38–39****Ruby**

- 1** **a–d** Marked scale to the nearest degree of accuracy.
- 2** **a** 9,000 g **b** 3,000 g **c** 4,500 g **d** 7,700 g
- 3** 0.440 kilograms
- 4** 6,000 grams

Pearl

- 1** **a** 250 g **b** 700 g
- 2** **a** 1.465 kg **b** 1.076 kg **c** 2,050 g **d** 700 g
- 3** 2,270 g
- 4** 1,985 g
- 5** 25
- 6** 90 g

Diamond

- 1** They are all wrong because 0.1kg is the same as 100 g, which is less than 375 g.
- 2** Disagree. The average mass of each person will be 75 kg, because $450 \text{ kg} \div 6 = 75 \text{ kg}$.
- 3** One possible combination: $0.7 \text{ kg} + 390 \text{ g} + 250 \text{ g} + 110 \text{ g}$
- 4** Gavin is correct because the weight of 4 rugby balls is equal to 1,800 g ($4 \times 450 \text{ g}$). Twelve cricket balls have the same mass as 1,800 g, so 1 cricket will have mass 150 g, because $1,800 \text{ g} \div 12 = 150 \text{ g}$.

Capacity Pages 40–41

Ruby

- a–d** Marked scale to the nearest degree of accuracy.
- a** 7 litres **b** 4.5 litres **c** 3.25 litres **d** 5,000 ml
- 930 ml
- 8 litres

Pearl

- a** 36,000 ml **b** 6,300 ml **c** 400 ml
- a** 7.425 l **b** 0.62 l **c** 8.94 l
- 216 litres
- 8.91 litres
- 17,500 ml
- 1,650 ml

Diamond

- Disagree. $870 \text{ ml} \div 12 = 72.5$
 $72.5 \times 30 = 2,175 \text{ ml}$
2 litres 175 millilitres
- $5 \times 180 = 900 \text{ ml}$, but she only has 750 ml of tea in her pot.
- 4.5 litres
- Statement 1 – True, because $37 \times 10 \text{ ml} = 370 \text{ ml}$, which is 5 ml less than the amount in the bottle.
Statement 2 – False, because $80 \times 5 \text{ ml} = 400 \text{ ml}$, which is greater than the amount in the bottle.
Statement 3 – True, because $150 \times 2.5 \text{ ml} = 375 \text{ ml}$, which is equal to the full amount in the bottle.

Converting imperial and metric units Page 42

Ruby

- 1 78 inches
- 2 0.2 ounces
- 3 6.6 pounds
- 4 122 centimetres
- 5 2.7 kilograms
- 6 9.1 litres

Pearl

- 1 a 80.5 km b 226.8 g c 40.95 litres d 274.5 cm
- 2 25.4 cm
- 3 4.025 km
- 4 3.15 kg

Diamond

- 1 Yes. 25 gallons equals 113.75 litres.
- 2 Omar is taller, because Jake is approximately 1.78 m tall.

Perimeter **Pages 43–44****Ruby**

- 1** **a** 20 cm **b** 44 cm **c** 44 cm
2 42 cm
3 21 m
4 60 m

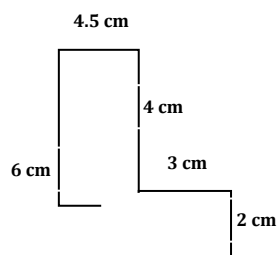
Pearl

- 1** 33 cm
2 **a** 20 cm **b** 44 cm
3 **a** 26 cm **b** 18 cm **c** 24 cm **d** 26 cm

Diamond

- 1** 11 cm length and 1 cm width
 10 cm length and 2 cm width
 9 cm length and 3 cm width
 8 cm length and 4 cm width
 7 cm length and 5 cm width
 6 cm length and 6 cm width (special case, a square)
 Accept any correct fractional answers.
- 2** Agree. To find the perimeter of any rectilinear shape you need to add the width and the length and multiply by 2.
- 3** 72 m

- 4** Possible answer:



Volume and capacity **Pages 47–48****Ruby**

- 1** **a** 100 ml **b** 1700 ml **c** 1200 ml
2 **a** ml **b** litres **c** ml
3 **a** 6 cm^3 **b** 6 cm^3 **c** 8 cm^3

Pearl

- 1** **a** 8 cm^3 **b** 7 cm^3 **c** 18 cm^3 **d** 36 cm^3
2 **a** 10 **b** 12 **c** 8

Diamond

- 1** Yes, Amy is correct. To find the volume of a cuboid you multiply the length \times width \times height. For example, the volume of a cuboid that had a length of 2 cm, width of 6 cm and height of 5 cm would be $2 \text{ cm} \times 6 \text{ cm} \times 5 \text{ cm} = 60 \text{ cm}^3$.
2 90 m^3
3 $2,592 \text{ cm}^3$
4 There are two possible solutions.

Solution1:

6 m = 600 cm, so 10 boxes will fit along this side.

2.4 m = 240 cm. $240 \div 60 = 4$, so 4 whole boxes will fit along the other 2 sides.

So number of boxes that will fit $10 \times 4 \times 4 = 160$

Solution 2:

Volume of container is $600 \times 240 \times 240 = 34,560,000 \text{ cm}^3$

Volume of box is $60 \times 60 \times 60 = 216,000 \text{ cm}^3$

Number of boxes is $34,560,000 \div 216,000 = 160$

- 5** **a** 18 **b** 32 **c** 23

2-D shapes Pages 49–50

Ruby

- 1 **a** square **b** rectangle
- 2 **a** trapezium **b** rhombus **c** parallelogram
- 3 **a** right-angled triangle **b** scalene **c** isosceles
 d scalene **e** equilateral

Pearl

- 1 **a** quadrilateral – irregular **b** rectangle – irregular
 c quadrilateral – irregular **d** octagon – irregular
- 2 **a** parallelogram or rectangle or rhombus or square **b** trapezium
 c rhombus
- 3 **a** I **b** I **c** S **d** E **e** I

Diamond

- 1 False. Although pentagons always have 5 sides, they do not have to always be equal.
- 2 True. All sides and angles must be equal.
- 3 True. All sides are different lengths and the angles are different.
- 4 True. A polygon can only have straight sides.
- 5 True.
- 6 False. 'Irregular' means not all sides are necessarily of equal length.
- 7 True. Not all sides are of equal length.
- 8 True. A polygon can only have straight sides.

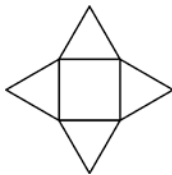
3-D shapes Pages 51–52

Ruby

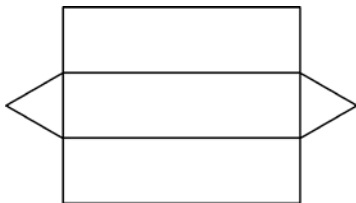
Name of shape	Number of vertices	Number of faces	Number of edges
Sphere	0	1	0
Cube	8	6	12
Cuboid	8	6	12
Cone	1	2	1
Cylinder	0	3	2
Tetrahedron	4	4	6
Triangular prism	6	5	9
Hexagonal prism	12	8	18

Pearl

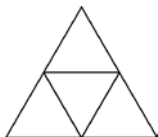
- 1 Nets b, d, g
- 2 Nets b, c, d
- 3 Learners to insert additional square faces onto each net to make a net of cube.
- 4



5



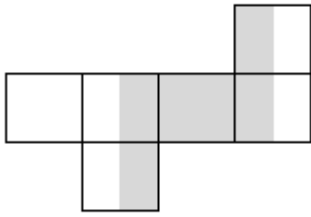
6



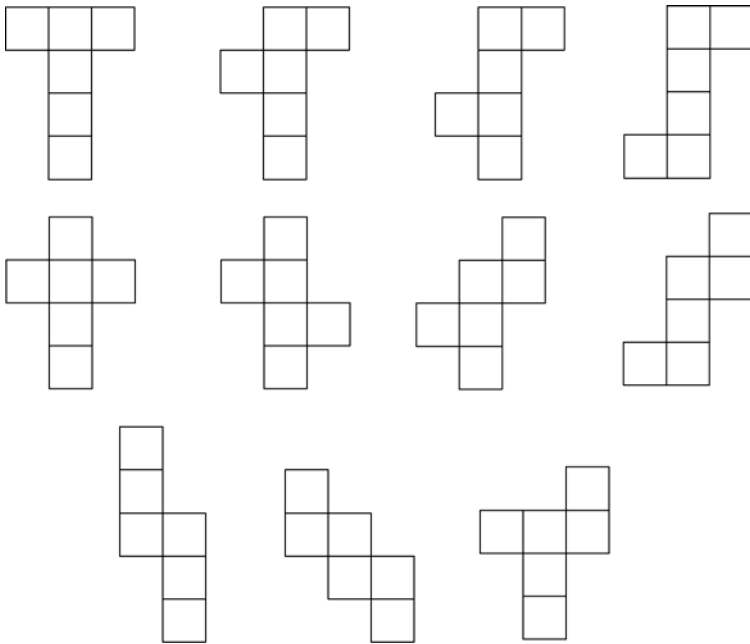
Diamond

- 1 Agree. The other squares form the sides of the cube.

2



3



4 Disagree, you can have different nets. For example, you can have all four triangles joined to each side of the square, or you can have all the triangles joined together and only one of the triangles joined to the square.

Identifying angles **Pages 53–54****Ruby**

- 1 acute
- 2 acute
- 3 right angle
- 4 obtuse
- 5 right angle
- 6 obtuse
- 7 obtuse
- 8 right angle
- 9 acute
- 10 acute

Pearl

- 1 a, e, b, d, f, c
- 2 a 110° b 30° c 80°
- 3 a 130° +/- 2° b 40° +/- 2°
- 4 Angles drawn to the nearest accuracy.

Diamond

- 1 a right-angle b obtuse c acute d straight line angle
e obtuse (or reflex)
- 2 a false b true c true d false
e true (or false if angle is assumed to be reflex)

Unknown angles **Pages 55–56****Ruby**

- 1** **a** = **b** < **c** = **d** > **e** > **f** =
- 2** **a** full **b** half **c** quarter **d** three-quarter

Pearl

- 1** **a** 118° **b** 63° **c** 148°
- 2** **a** 293° **b** 236° **c** 153°
- 3** **a** 45° **b** 18° **c** 10°
- 4** **a** 116° **b** 168°

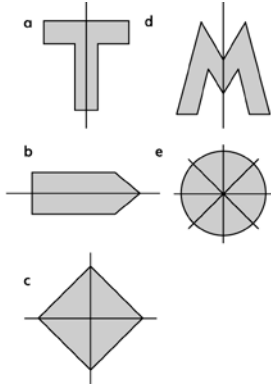
Diamond

- 1** The unknown angle in the triangle is 20°, so angle **a** is equal to 205°.
- 2** Any two angles that add up to 125°. For example, 10° + 115°, 45° + 80°, 30° + 95°, 55° + 70°
- 3** Agree. To calculate angle **x**, you need to add the two known angles and subtract this from 180°.
Angle **x** = 107°

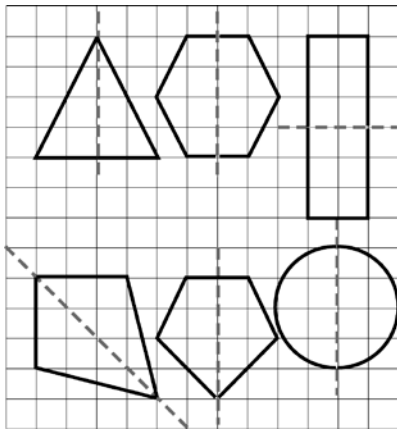
Reflection Pages 57–58

Ruby

1

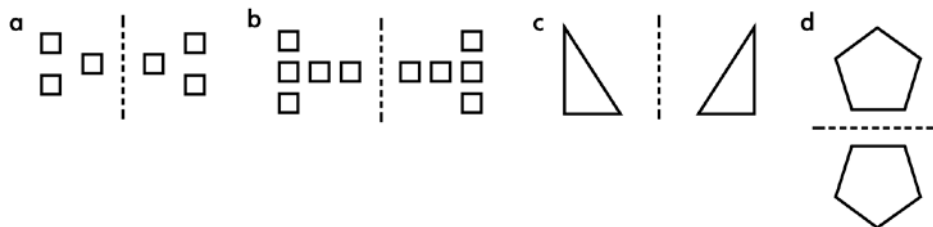


2



Pearl

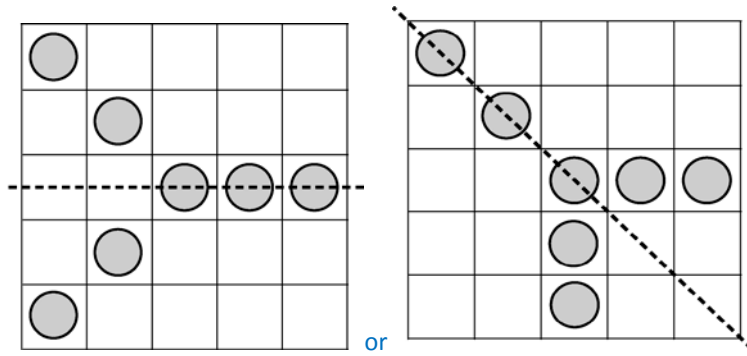
1



2 Triangle, rectangle and arrow ticked.

Diamond

1



2 a, b and e.

3 4-sided regular polygon then it has 4 lines of symmetry, 5-sided regular polygon then it has 5 lines of symmetry, 6-sided regular polygon then it has 6 lines of symmetry.

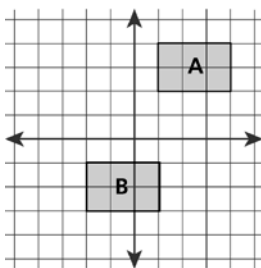
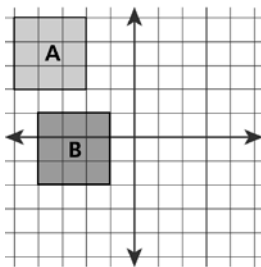
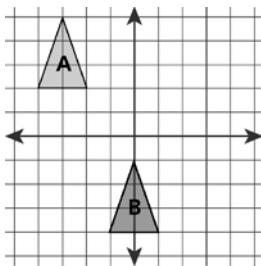
Translations Pages 59–60

Ruby

- 1 a Left 1 b Down 3 c Down 0 d Right 2
 2 a Right 2, Down 3 b Down 5
 c Left 4, Up 1 d Right 4, Down 1

Pearl

- 1 a Right 8, Down 5 b Right 6, Up 6 c Left 9, Down 5
 2, 3, 4



Diamond

- 1 Disagree. Shape A to B has been translated left 6 and up 6.
 2 (10, 17), (10, 37), (25, 17), (25, 37)

Line graphs Page 61

Ruby

- 1 -1°C
- 2 0°C
- 3 8°C
- 4 10 p.m.
- 5 -4°C
- 6 4 a.m.
- 7 1 a.m. and 5 a.m.
- 8 7°C
- 9 3 hours
- 10 4 hours

Pearl

- 1 **a** 127 cm **b** 5 years **c** 17 cm **d** 95 cm
- 2 Pupils to draw line graph showing data given.

Diamond

- 1 Learners to justify their answers. For example:
I would recommend going to Ghana in June because the temperature is approximately 30°C and rainfall expected at this time of the year is low, 5 mm.

Timetables **Page 63****Ruby**

- 1 Garage
- 2 78
- 3 129 vans
- 4 127 vehicles
- 5 388 vehicles
- 6 14 girls
- 7 12 boys
- 8 52 boys
- 9 16 girls
- 10 94

Pearl

- 1 10 hours and 30 minutes
- 2 Friday, the pool closes at 9 p.m.
- 3 11:15 a.m.
- 4 3:25 p.m.
- 5 3 flights
- 6 19:55

Diamond

- 1 False. Sam can take two trains, either the 8:31 a.m. or 8:19 a.m.
- 2 False. Both the 9004 and Monday to Saturday 9010 take 3 hours 16 minutes and stop at neither Ebbsfleet nor Ashford.
- 3 False. Trains from London to Ebbsfleet take from 17 minutes to 19 minutes.
- 4 True. The earliest you can get there is 9:17 a.m.