Chapter practice: answer key

1. Numbers

1.1 Integer; rational; irrational.

1.2 −0.77, −0.7, −0.07.

1.3 −18 + 25 − 12 = −€5.

2. Factors and Multiples

2.1 $90 = 2 \times 3^2 \times 5$.

2.2 HCF 12; LCM 72.

2.3 LCM(18, 24) = 72 minutes later.

3. Fractions

3.1 3/4, after dividing both by 14.

3.2 10/12 − 3/12 = 7/12.

3.3 3/5 × 3/4 = 9/20.

4. Decimals

4.1 375/1000 = 3/8.

4.2 0.047.

4.3 13 lengths. 4.8 − 13(0.35) = 0.25 m.

5. Percentages

5.1 €36.

5.2 12/75 × 100% = 16%.

5.3 144 ÷ 0.8 = €180.

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6. Ratio and Proportion

6.1 2 : 3.

6.2 €30 and €75.

6.3 €1.75 each; €24.50 total.

7. Number Extensions

7.1 $3^3 = 27$.

7.2 $5\sqrt{2} - 2\sqrt{2} = 3\sqrt{2}$.

7.3 4.84×10^{-4}.

8. Financial Maths

8.1 $160 \times 1.23 = €196.80$.

8.2 Mark-up 20/60 = 33⅓%; margin 20/80 = 25%.

8.3 $900 \times 1.03^2 = €954.81$.

9. Sets

9.1 {2}; {1, 2, 3, 4}.

9.2 {2, 4}.

9.3 $30 - (18 + 13 - 6) = 5$.

10. Algebra 1

10.1 $-6x + 15$.

10.2 $6((x + 2)/3) = 6((x - 1)/2)$, so $2(x + 2) = 3(x - 1)$; $x = 7$.

10.3 $x \leq 3$; filled dots at 1, 2, 3.

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11. Algebra 2: factorising, fractions and formulae

11.1 $5x(3x - 2)$.

11.2 $(x - 3)/((x + 1)(x - 1))$; $x \neq -1, 1$.

11.3 $r = \sqrt{(V/(\pi h))}$; take the non-negative root.

12. Equations and Extensions

12.1 $(x - 3)(x + 4) = 0$, so $x^2 + x - 12 = 0$.

12.2 Add: $3x = 9$; $x = 3$, $y = 1$.

12.3 $b^2 - 4ac = 4 - 24 = -20$; no real roots.

13. Patterns

13.1 $T_n = 12 + (n - 1)5 = 5n + 7$.

13.2 $5n + 7 = 72$, so $n = 13$.

13.3 Tripling: ratio 3. Quadratic: second difference 2.

14. Functions and graphs

14.1 6.

14.2 $(0, -8)$ and $(4, 0)$.

14.3 The lines meet at $(3, 6)$; f is above g when $x < 3$.

15. Measurement

15.1 7,500 cm^2.

15.2 96 cm^3.

15.3 $2\pi(4^2) + 2\pi(4)(9) = 104\pi$ cm^2.

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16. Triangles and Proof

16.1 58°.

16.2 $7^2 + 24^2 = 625 = 25^2$, so yes.

16.3 Length scale 1.5; area = $20 \times 1.5^2 = 45$ cm².

17. Trigonometry

17.1 $14 \cos 36° \approx 11.33$ cm.

17.2 $\tan^{-1}(9/12) \approx 36.9°$.

17.3 $\tan^{-1}(4.2/1.8) \approx 66.8°$.

18. Circles

18.1 12π cm and 36π cm².

18.2 73°.

18.3 68°; opposite angles sum to 180°.

19. Transformations

19.1 (3, 4).

19.2 (5, 2).

19.3 Two midlines and no diagonals. Yes, a half-turn about its centre maps it onto itself.

20. Coordinate Geometry 1

20.1 $(-1, 4)$.

20.2 $6/4 = 3/2$.

20.3 $\sqrt{(6^2 + (-8)^2)} = 10$.

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21. Coordinate Geometry 2

21.1 $y = 3x + 1$.

21.2 $y = -x/4 + 3$.

21.3 $x = 2$, $y = 4$; point $(2, 4)$.

22. Constructions 1–15

22.1 Two pairs of equal-radius arcs give two cuts; the line through the cuts meets the segment at 90° and at its midpoint.

22.2 Draw AB; use arcs of radius 4 cm from A and 5 cm from B. Their intersection is C. Join AC and BC.

22.3 Draw AC and a perpendicular at A. At C make 60° from CA on the chosen side and extend its ray to meet the perpendicular at B.

23. Statistical Investigations

23.1 Time is numerical (continuous); travel method is categorical.

23.2 Example: How many kilometres do students in second year travel to school on a typical day?

23.3 Frequent users are overrepresented. Sample randomly across year groups or class lists, including non-users.

24. Charts

24.1 $18/60 \times 360° = 108°$.

24.2 $3 + 5 = 8$.

24.3 Bar chart for sports; histogram for grouped journey times.

25. Averages and Spread

25.1 Median 6; mode 6; range 10.

25.2 $(6 + 20 + 14)/10 = 4$.

25.3 The second class has a larger max–min spread. The ranges do not tell us how the remaining scores are distributed.

Chapter practice: answer key

26. Probability

26.1 2/6 = 1/3.

26.2 27/90 = 0.3.

26.3 0.82; about 41 days.

27. Combined Events

27.1 HH, HT, TH, TT.

27.2 3/5 × 2/4 = 3/10.

27.3 (3/5 × 2/4) + (2/5 × 3/4) = 3/5.

28. Course Review

28.1 A: €7 and 20%. B: €12 and 15%. B rises more in euro, A more in percentage terms.

28.2 Write them as 2n and 2n + 2. Their sum is 4n + 2.

28.3 9 cm represents 2.25 km; 45 min = 0.75 h, so speed is 3 km/h. Assumes the measured map route matches the route walked.