

Gammes du soir (evening drills), Chapter 01A: Similar triangles

Year 10

5 questions each evening, answers at the bottom of the block: I mark my own work, any underlying mistake goes into the error log

This is level 2 of the working agreement (Charter signed in chapter 00): on the evening of each lesson, after re-reading the course notes, I do the 5 questions in the day's block without a calculator, write my answers in the exercise book, then turn the sheet over to mark my own work. The questions cycle through module M1, chapter 00, chapter 01, prior knowledge from Year 9 and the technique from chapter 01A already taught. A mistake understood is worth more than a right answer guessed; a mistake not understood is kept for the next lesson; we show it, we do not hide it.

Evening of S0

- [chapter 01] Calculate: $\frac{2}{9} + \frac{5}{18}$.
- [chapter 00] Write 84 as a product of prime factors.
- [module M1] In "If an integer is a multiple of 6, then it is even", identify the hypothesis and the conclusion.
- [Year 9 fluency skill] In a triangle, two angles measure 34° and 59° . What does the third angle measure?
- [chapter 01A] One triangle has sides 4; 5; 6 and another 6; 7; 5; 9. Are they similar? (Check all three ratios.)

Answers: 1. $\frac{1}{6} + \frac{5}{18} = \frac{3}{18} + \frac{5}{18} = \frac{8}{18} = \frac{4}{9}$. 2. $84 = 2^2 \times 3 \times 7$. 3. Hypothesis: "the integer is a multiple of 6"; conclusion: "it is even". 4. $180^\circ - 34^\circ - 59^\circ = 87^\circ$. 5. Yes: $\frac{4}{6} = \frac{5}{7.5} = \frac{6}{9} = 1.5$, the sides are proportional (scale factor 1.5).

Evening of S1

- [chapter 01] Write as a single power: $7^5 \times 7^{-2}$.
- [chapter 00] Is 51 a prime number? Justify without a calculator.
- [module M1] Is the converse of "multiple of 6 $\Rightarrow$ even" true? Give a counterexample if needed.
- [Year 9 fluency skill] This table is proportional: $7 \rightarrow 4.2$; $10 \rightarrow ?$ Complete it.
- [chapter 01A] One triangle has two angles of 38° and 71° ; another has two angles of 71° and 71° . Are they similar?

Answers: 1. $7^{5+(-2)} = 7^3$. 2. No: 51 is divisible by 3 ($51 = 3 \times 17$). 3. No: 4 is even without being a multiple of 6 (constant of proportionality 0.6). 4. 6. 5. Yes: the angles are 38° , 71° , 71° in both triangles.

Evening of S2

- [chapter 01] Calculate: $\frac{5}{6} \times \frac{3}{10}$.
- [chapter 00] Given $126 = 2 \times 3^2 \times 7$ and $90 = 2 \times 3^2 \times 5$, deduce HCF(126; 90).
- [module M1] Complete: if $n = 4k$ where k is an integer, then $n = 2 \times (\dots)$; so n is even.
- [Year 9 fluency skill] Right-angled triangle, legs 8 cm and 15 cm; length of the hypotenuse?
- [chapter 01A] Two corresponding sides measure 4,8 in a first triangle and 7,2 in a second. What does a side of 6 in the first triangle become in the second?

Answers: 1. $\frac{1}{4}$. 2. Common factors: $2 \times 3^2 = 18$. 3. 2k. 4. 17 cm. 5. $k = \frac{4.8}{2} = 2.4$, so $6 \times 1.5 = 9$.

Evening of S3

- [chapter 01] Write in standard form (scientific notation): 47 000 and 0,005 2.
- [chapter 00] Is 7 341 divisible by 3? by 9? Justify without doing long division.
- [module M1] Write the negation of " $x > 3$ ".
- [Year 9 fluency skill] Two parallel lines are cut by a transversal; one alternate interior angle measures 118° . What does the other measure?
- [chapter 01A] Two triangles have an included angle of the same size; the adjacent sides measure 5 and 8, and 7,5 and 12. Are they similar?

Answers: 1. 4.7×10^4 ; 5.2×10^{-3} . 2. Sum of digits is 15, not by 9. 3. $x \leq 3$. 4. 118° . 5. Yes: $\frac{5}{7.5} = \frac{8}{12} = \frac{2}{3}$ and the equal angle is included between these sides.

Evening of S4

- [chapter 01] Write $2^7 \times 2^{-4}$ as a single power, then give its value.
- [chapter 00] Write $\frac{45}{75}$ in lowest terms using the HCF.
- [module M1] Given "if P , then Q " and P , what conclusion can we draw?
- [Year 9 fluency skill] Five identical notebooks cost 7 €. Price of eight notebooks?
- [chapter 01A] A triangle of area 50 cm^2 is reduced by scale factor 0,4. What is its new area?

Answers: 1. $2^3 = 8$. 2. HCF = 15, so $\frac{45}{75} = \frac{3}{5}$. 3. Q. 4. 11,20 €. 5. $50 \times 0.4^2 = 50 \times 0.16 = 8 \text{ cm}^2$.

Evening of S5

- [chapter 01] Calculate: $\frac{4}{7} \div \frac{2}{21}$.
- [chapter 00] Is 143 a prime number? Justify.
- [module M1] What counterexample disproves "all prime numbers are odd"?
- [Year 9 fluency skill] Right-angled triangle, hypotenuse 25 cm, one leg 24 cm: the other leg?
- [chapter 01A] On a map at scale $1/250$, a length measures 3,6 cm. What is the actual length in metres?

Answers: 1. 6. 2. No: 143 = 11×13 . 3. The prime number 2. 4. 7 cm. 5. $3.6 \times 250 \text{ cm} = 900 \text{ cm} = 9 \text{ m}$.

Evening of S6: night before the test

- [chapter 01] Calculate and give the result in standard form: $(2 \times 10^5) \times (3 \times 10^{-2})$.
- [chapter 00] Write 150 as a product of prime factors.
- [module M1] Is the converse of "multiple of 9 $\Rightarrow$ multiple of 3" true? Give a counterexample.
- [Year 9 fluency skill] In a right-angled triangle, one acute angle measures 27° . What does the other acute angle measure?
- [chapter 01A] Two similar triangles have areas 36 cm^2 and 81 cm^2 . What is the scale factor from the first to the second?

If there is a second evening before the test: redo the missed questions on the sheet and re-read the error log.

Answers: 1. 6×10^3 . 2. $150 = 2 \times 3 \times 5^2$. 3. No: 6 is a multiple of 3 without being a multiple of 9. 4. 63° . 5. $k^2 = \frac{36}{81} = \frac{4}{9}$, so $k = 1.5$.

Evening of S7, the test is over: well-earned rest, no evening drills tonight; re-read your error log (the entries for this chapter) and close the notebook. The answers are provided so that I can mark my own work: I try, I write out my working, I turn the sheet over; and I only ask afterwards. That is the working agreement in the Charter.