JUNIOR CYCLE MATHS · FREE REVISION SHEET

Problem solving & exam mix

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Learning outcomes (2018 specification): U.5, U.6, U.7, U.8, U.9, U.10, U.13. Play the game: **leim.ie/exam-mix.html**

Most exam questions join two or three topics: an **area** becomes a **cost**, a **speed** becomes a **clock time**. Each step is easy on its own. The skill is spotting the steps.

1. Four steps for any problem

1. Read
Underline the numbers and units. What is the question asking for?

2. Plan
Which topic? What do I need first? Draw a sketch.

3. Do
One step per line. Say what each number is.

4. Check
Units? Sensible size? Rounded the right way? Answered the question?

2. Spot the hidden middle number

Garden 10 m by 6 m, fence €20 per m
Perimeter = 2 × (10 + 6) = **32 m** → 32 × €20 = **€640**

Wall 8 m by 3 m, 1 tin covers 5 m²
Area = **24 m²** → 24 ÷ 5 = 4.8 → **5 tins** (round up)

150 km at 60 km/h, leaves 10:15
Time = 150 ÷ 60 = **2.5 h** = 2 h 30 min → **12:45**

Mean of 5 tests must be 70; first four add to 268
Total needed = 5 × 70 = **350** → 350 − 268 = **82**

3. How marks are given

Each part is marked in steps. A right method with one slip still gets most of the marks; a bare wrong answer gets none. If part (a) is wrong but you use it correctly in part (b), you can still get (b).

4. Traps

- **Two discounts:** 20% off then 10% off is NOT 30% off. €100 → €80 → **€72**.
- **Units:** 1 litre = 1000 cm³ · 1 m = 100 cm · 1 m² = 10,000 cm². Change them first.
- **Rounding:** tins, buses, boxes → round **up**. "How many can you build / buy?" → round **down**.
- **Time:** 1.25 h = 1 h 15 min, not 1 h 25 min. 0.1 h = 6 min.
- **Working backwards:** after a 23% VAT rise, divide by 1.23 (not take away 23%).
- **Read the last line again:** "how much is LEFT", "how many MORE", "to 1 decimal place".

Which topic is it? "fence, border, edge" → perimeter · "cover, paint, carpet" → area · "fill, hold, litres" → volume · "km/h, arrive" → speed and time · "per hour, overtime, tax" → money · "chance, likely" → probability · "average" → mean.

Exam tip: never leave a part blank. Write the formula or the first step: it can earn marks. Then move on and come back.

PRACTICE · 20 PROBLEMS

Have a go

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Show every step. Use a calculator where you need one.

A. Number and money

1. A garden is 15 m by 9 m. Fencing costs €12 per metre. Find the cost of fencing all the way round.
2. A €120 coat is reduced by 25%, then by 20% of the new price. Find the final price.
3. €350 is shared in the ratio 3 : 4. The smaller share spends ⅓ of it. How much is left?
4. Seán earns €18 an hour for 37 hours, plus 5 hours overtime at time-and-a-half. Find his gross pay.
5. Aoife changes €300 to dollars at €1 = $1.10. She spends $175. How many dollars has she left?

B. Algebra

6. A taxi charges €4 plus €1.50 per km. A fare is €19. How far was the trip?
7. A rectangle has perimeter 50 cm. Its length is 5 cm more than its width. Find its area.
8. Stage n of a pattern uses 5n + 3 tiles. You have 100 tiles. What is the biggest stage you can build?
9. Plan A costs €12 a month + €3 per GB. Plan B costs €5 per GB. For how many GB do they cost the same?

C. Geometry and measure

10. A wall is 7 m by 2.6 m. It needs 2 coats of paint. One tin covers 8 m². How many tins are needed?
11. A field is 20 m by 21 m. How many metres do you save by walking the diagonal instead of along two sides?
12. A fish tank is 60 cm × 40 cm × 50 cm. It fills at 4 litres a minute. How long does it take to fill?
13. A pizza has radius 15 cm. It is cut into 8 equal slices. Find the area of one slice (π = 3.14), to 1 decimal place.
14. A ramp rises 1.2 m over a horizontal distance of 5 m. Find the length of the ramp, to 2 decimal places.

D. Statistics and probability

15. Ben's first four test scores are 68, 74, 59 and 81. He wants a mean of 72 after five tests. What must he score in test 5?
16. A bag has 4 red and 11 blue counters. How many red counters must be added so that P(red) = ½?
17. A spinner lands on red with probability 0.35. It is spun 200 times. How many reds would you expect?
18. 25 students have a mean height of 152 cm. A new student who is 178 cm tall joins. Find the new mean height.

E. Time and exam-style

19. A bus travels 210 km at 60 km/h. It leaves at 07:50. When does it arrive?
20. A school buys 6 tablets at €240 each, plus VAT at 23%. (a) Find the total cost. (b) It pays in 12 equal monthly amounts. Find each amount.

CHECK YOUR WORK

Answers

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1	**€576** (Perimeter 2 × (15 + 9) = 48 m. 48 × €12)
2	**€72** (€120 × 0.75 = €90, × 0.8)
3	**€100** (1 part = €50, smaller = €150, spends €50)
4	**€801** (€666 + 5 × €27)
5	**$155** (€300 × 1.10 = $330)
6	**10 km** (4 + 1.5k = 19, 1.5k = 15)
7	**150 cm²** (2w + 2(w + 5) = 50, w = 10)
8	**Stage 19** (5n + 3 ≤ 100, n ≤ 19.4)
9	**6 GB** (12 + 3g = 5g)
10	**5 tins** (7 × 2.6 × 2 = 36.4 m², ÷ 8 = 4.55, round up)
11	**12 m** (√(20² + 21²) = 29 m)
12	**30 min** (120000 cm³ = 120 litres)
13	**88.3 cm²** (3.14 × 15² = 706.5, ÷ 8)
14	**5.14 m** (√(1.2² + 5²) = √26.44)
15	**78** (5 × 72 = 360, 360 − 282)
16	**7** (red must equal blue)
17	**70** (0.35 × 200)
18	**153 cm** (25 × 152 = 3800, + 178, ÷ 26)
19	**11:20** (3.5 h = 3 h 30 min)
20	**(a) €1,771.20 (b) €147.60** (€1,440 × 1.23)

Worked examples

2. Two discounts
25% off: €120 × 0.75 = €90. 20% off the new price: €90 × 0.8 = **€72**. (45% off would give €66: wrong.)

8. Biggest stage
5n + 3 ≤ 100 → 5n ≤ 97 → n ≤ 19.4. Stage 20 needs 103 tiles, so the answer is **Stage 19** (round down).

12. Fish tank
60 × 40 × 50 = 120,000 cm³. 1 litre = 1000 cm³, so 120 litres. 120 ÷ 4 = **30 minutes**.

19. Arrival time
210 ÷ 60 = 3.5 h = 3 h 30 min. 07:50 + 3 h = 10:50, + 30 min = **11:20**.

Got one wrong? Which step went wrong: the plan, the units, the rounding? Then play **Exam Mix** at leim.ie/exam-mix.html: each question shows which topic it's from, and the end screen links to the game for that topic.

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