COMMON MISTAKES

TO AVOID IN YOUR MATHS EXAM

The Complete Guide for GCSE & IGCSE Students

Most marks lost in GCSE and IGCSE Maths exams are **not** because students don't know the topic — they're lost through avoidable mistakes. This guide catalogues the most common errors across every major topic, shows you exactly what goes wrong, and teaches you how to get it right every time.

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Each section shows the mistake, the correct approach, and a short explanation of why students get it wrong. Use this guide to identify your own weak spots and eliminate them before exam day.

■ How to Use This Guide

- Read each mistake carefully — even if you think 'I'd never do that'. You'd be surprised.
- After each practice paper, come back here and check if any of your errors match these patterns.
- **Highlight** any mistake you've made before. Those are your priority fixes.
- Keep this guide alongside your revision notes and review it the week before each exam.

Section	Mistakes	I knew	I do this!
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2. Algebra	8		
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Total	**47**		

After reading, tick the "I do this!" column for any mistake you recognise in yourself. Those are your priority fixes.

1 General Exam Technique Mistakes

Mistakes that cost marks regardless of the topic.

1.1. Not reading the question properly

✗ **Wrong:** Question says 'find the perimeter' — student calculates the area.

✓ **Right:** Read the question **twice**. Underline the key word (perimeter, area, volume, simplify, solve, etc.).

Why: Under time pressure, students skim and answer what they *expect* to see, not what's actually asked.

1.2. Not showing working

✗ **Wrong:** Student writes only the final answer: $x = 5$

✓ **Right:** Show every step: $3x + 2 = 17 \rightarrow 3x = 15 \rightarrow x = 5$

Why: Examiners award method marks (M marks) for correct steps. No working = no method marks, even if the answer is right.

1.3. Forgetting units

✗ **Wrong:** Answer: 48

✓ **Right:** Answer: 48 cm^2

Why: Many questions award a mark specifically for correct units. Students lose 1–2 marks per paper on units alone.

1.4. Rounding too early

✗ **Wrong:** Using 3.14 for π in the middle of a calculation, then rounding again at the end.

✓ **Right:** Keep the full π value (or use the calculator's π button) throughout. Only round the **final** answer.

Why: Premature rounding causes cumulative errors. On a 5-mark question, this can lose you the final accuracy mark.

1.5. Not answering every part of a question

✗ **Wrong:** Question asks 'find x and y' — student only finds x.

✓ **Right:** Check every question has all parts answered. Look for 'and', 'both', 'each', 'hence find'.

Why: Multi-part questions are common. Missing one part means missing those marks entirely.

1.6. Leaving questions blank

✗ **Wrong:** Student skips a hard question entirely.

✓ **Right:** Write down the formula, draw a diagram, attempt the first step. Any partial method can earn marks.

Why: A blank answer is guaranteed zero. Even 1 mark on a hard question adds up across the paper.

1.7. Poor time management

✗ **Wrong:** Spending 12 minutes on a 3-mark question.

✓ **Right:** Use the rule: **1 mark ≈ 1 minute**. If you're over time, circle it and move on.

Why: Spending too long on one question means running out of time for easier marks later.

1.8. Crossing out correct work

✗ **Wrong:** Student crosses out their first attempt, which was actually correct, then writes a wrong answer.

✓ **Right:** Only cross out work if you are replacing it with something better. If in doubt, leave it visible.

Why: Examiners **cannot** mark crossed-out work, even if it's correct.

2 Algebra Mistakes

The most common algebraic errors in GCSE/IGCSE exams.

2.1. Sign errors when expanding brackets

✗ **Wrong:** $-2(x - 5) = -2x - 10$

✓ **Right:** $-2(x - 5) = -2x$ **+ 10**

Why: Negative × negative = positive. Students forget to apply the negative to the second term.

2.2. Not multiplying every term inside the bracket

✗ **Wrong:** $3(2x + 4) = 6x + 4$

✓ **Right:** $3(2x + 4) = 6x$ **+ 12**

Why: The 3 must multiply both $2x$ and +4. This is the single most common algebra error.

2.3. Collecting unlike terms

✗ **Wrong:** $3x + 2y = 5xy$

✓ **Right:** $3x + 2y$ **cannot be simplified further**

Why: Only like terms (same variable and power) can be combined. x and y are different variables.

2.4. Errors in double bracket expansion

✗ **Wrong:** $(x - 4)(x + 2) = x^2 + 2x - 4x + 8$

✓ **Right:** $(x - 4)(x + 2) = x^2 + 2x - 4x -$ **8**

Why: $(-4) \times (+2) = -8$, not +8. Always check the sign of the constant term by multiplying the last terms carefully.

2.5. Wrong factorising of quadratics

✗ **Wrong:** $x^2 - 5x + 6 = (x - 2)(x + 3)$

✓ **Right:** $x^2 - 5x + 6 = (x - 2)(x -$ **3**$)$

Why: The pair must multiply to +6 AND add to –5. Both (–2) and (–3) are negative. Always check by expanding.

2.6. Solving equations — doing different operations to each side

✗ **Wrong:** $2x + 3 = 11 \rightarrow 2x = 14$ (subtracted 3 from left, added 3 to right)

✓ **Right:** $2x + 3 = 11 \rightarrow 2x =$ **8** (subtract 3 from **both** sides)

Why: Whatever you do to one side, you must do to the other. This is the fundamental rule of equations.

2.7. Rearranging — forgetting to flip the operation

✗ **Wrong:** Make x the subject of $y = 3x - 7 \rightarrow x = y - 7 / 3$

✓ **Right:** $y + 7 = 3x \rightarrow \mathbf{x = (y + 7) / 3}$

Why: Add 7 first, then divide. The division applies to the *whole* expression ($y + 7$), not just 7.

2.8. Simultaneous equations — forgetting to find both variables

✗ **Wrong:** $3x = 9 \rightarrow x = 3$. Done.

✓ **Right:** $3x = 9 \rightarrow x = 3$. Substitute back: $\mathbf{y = 1}$. State both values.

Why: The question asks for x and y. Finding only one variable means dropping marks for the other.

■ **Algebra Golden Rule**
After solving any equation, **substitute your answer back in** to check it works. This takes 10 seconds and catches most errors before the examiner sees them.

3 Number & Arithmetic Mistakes

Errors with calculations, fractions, percentages, and number operations.

3.1. Negative number errors

✗ **Wrong:** $(-3)^2 = -9$

✓ **Right:** $(-3)^2 = (-3) \times (-3) = \mathbf{+9}$. But note: $-3^2 = -(3^2) = -9$.

Why: Brackets matter. $(-3)^2$ squares the whole thing. -3^2 only squares the 3, then applies the negative.

3.2. Adding/subtracting fractions without common denominators

✗ **Wrong:** $1/3 + 1/4 = 2/7$

✓ **Right:** $1/3 + 1/4 = 4/12 + 3/12 = \mathbf{7/12}$

Why: You cannot add fractions by adding tops and bottoms separately. Find the LCM of the denominators first.

3.3. Percentage of vs percentage change

✗ **Wrong:** 'What is 60% of 200?' Student writes $200 \times 60 = 12000$

✓ **Right:** $200 \times 0.60 = \mathbf{120}$. (Or: 10% = 20, so 60% = 120)

Why: Convert the percentage to a decimal (÷100) before multiplying. Or use the 10% building-block method.

3.4. Reverse percentage error

✗ **Wrong:** A price after 20% increase is £60. Original = 60 – 20% of 60 = £48.

✓ **Right:** $60 \div 1.20 = \mathbf{£50}$

Why: You can't take 20% off the *new* price — 20% of £60 is not the same as 20% of the original. Divide by the multiplier instead.

3.5. Standard form errors

✗ **Wrong:** $36{,}000 = 36 \times 10^3$

✓ **Right:** $36{,}000 = \mathbf{3.6 \times 10^4}$

Why: The number part must be between 1 and 10. 36 is too big — adjust to 3.6 and increase the power.

3.6. Estimation — giving an exact answer

✗ **Wrong:** Estimate 3.8 × 21.2. Student writes 80.56.

✓ **Right:** Round first: 4 × 20 = **80**

Why: 'Estimate' means round to 1 significant figure first, then calculate. An exact answer scores **zero**.

3.7. Order of operations (BIDMAS) errors

✗ **Wrong:** 3 + 4 × 2 = 14

✓ **Right:** 3 + 4 × 2 = 3 + 8 = **11**

Why: Multiplication comes before addition. Remember: Brackets, Indices, Division/Multiplication, Addition/Subtraction.

■ **Number Golden Rule**

If your answer looks unreasonable, it probably is. A person's age shouldn't be 350. A discount can't make a price negative. A length can't be –5 cm. Always do a quick sense-check before moving on.

4 Geometry & Measures Mistakes

Errors with shapes, angles, area, volume, and trigonometry.

4.1. Confusing area and perimeter

✗ **Wrong:** Perimeter of a rectangle 5cm × 3cm = 15 cm

✓ **Right:** Perimeter = 2(5 + 3) = **16 cm**. Area = 5 × 3 = 15 cm^2.

Why: Perimeter is the distance around. Area is the space inside. They use completely different formulae.

4.2. Using diameter instead of radius (or vice versa)

✗ **Wrong:** Area of a circle with diameter 10 cm: $A = \pi \times 10^2 = 100\pi$

✓ **Right:** Radius = 10 ÷ 2 = 5. Area = $\pi \times 5^2 = \mathbf{25}\pi$ cm^2

Why: The formula uses radius, not diameter. Always check: if the question gives diameter, halve it first.

4.3. Not stating geometric reasons

✗ **Wrong:** 'Angle = 70° because the angles add up.'

✓ **Right:** 'Angle = 70° because **angles in a triangle sum to 180°** (180 – 60 – 50 = 70).'

Why: Geometry questions require the mathematical reason. 'They add up' is not sufficient. Use precise terminology.

4.4. Pythagoras — adding when you should subtract

✗ **Wrong:** Finding a shorter side: $a^2 = 13^2 + 5^2 = 194$

✓ **Right:** Shorter side: $a^2 = 13^2 – 5^2 = 169 – 25 = 144$, so a = **12**

Why: Add when finding the hypotenuse. Subtract when finding a shorter side. If the answer is bigger than the hypotenuse, you've gone wrong.

4.5. Trigonometry — calculator in wrong mode

✗ **Wrong:** sin(30°) = –0.988... (calculator in radians mode)

✓ **Right:** sin(30°) = **0.5** (calculator in degrees mode)

Why: Always check your calculator is in DEG mode before any trig question. If your trig answers look 'strange', this is almost certainly why.

4.6. Mixing up SOH CAH TOA

✗ **Wrong:** Using sin when you should use tan.

✓ **Right:** Label sides first: **Opposite**, **Adjacent**, **Hypotenuse**. Then pick the right ratio based on which two sides you're using.

Why: Draw the triangle separately, label all three sides, then choose: SOH (sin = O/H), CAH (cos = A/H), TOA (tan = O/A).

4.7. Volume — using the wrong formula

✗ **Wrong:** Volume of a cylinder = $2\pi rh$

✓ **Right:** Volume of a cylinder = $\pi r^2 h$. ($2\pi rh$ is the curved surface area.)

Why: Volume needs the area of the cross-section (circle) × height. Surface area is a completely different formula.

■ Geometry Golden Rule

Always draw and label a diagram. Even if one is given, redraw it with your own measurements. Most geometry errors come from not visualising the problem clearly.

5 Ratio & Proportion Mistakes

Errors with ratios, direct/inverse proportion, and sharing.

5.1. Writing the ratio in the wrong order

✗ **Wrong:** 'Boys to girls = 3 : 5' when there are 5 boys and 3 girls.

✓ **Right:** Read the question carefully. 'Boys to girls' means boys **first**: **5 : 3**.

Why: Ratio order must match the question order. Swapping loses both marks.

5.2. Not simplifying ratios fully

✗ **Wrong:** 12 : 8

✓ **Right:** 12 : 8 = **3 : 2** (divide both by HCF = 4)

Why: Always check if both numbers share a common factor. Unsimplified ratios may not earn full marks.

5.3. Sharing in a ratio — dividing by the wrong total

✗ **Wrong:** Share £60 in the ratio 2 : 3. Student does 60 ÷ 2 = 30 and 60 ÷ 3 = 20.

✓ **Right:** Total parts = 2 + 3 = 5. One part = 60 ÷ 5 = 12. Shares: **£24 and £36**.

Why: Find total parts first, then the value of one part, then multiply.

5.4. Confusing direct and inverse proportion

✗ **Wrong:** If 5 workers take 10 hours, 10 workers take 20 hours (double workers = double time).

✓ **Right:** 10 workers take **5 hours** (double workers = **half** time). This is inverse proportion.

Why: Direct: as one increases, the other increases. Inverse: as one increases, the other decreases.

5.5. Proportion equation — not finding *k* first

✗ **Wrong:** y is proportional to x^2. When $x = 3$, $y = 45$. Find y when $x = 5$. Student writes $y = 5^2 = 25$.

✓ **Right:** Set up: $y = kx^2$. Find k: $45 = k(9)$, $k = 5$. Then: $y = 5 \times 25 = \mathbf{125}$.

Why: You must always find the constant k first using the given values, then use k to find the unknown.

6 Graphs & Functions Mistakes

Errors with straight lines, curves, and function notation.

6.1. Confusing gradient and y-intercept

✗ **Wrong:** $y = 3x + 2 \rightarrow$ gradient = 2, intercept = 3.

✓ **Right:** $y = 3x + 2 \rightarrow$ gradient = **3**, y-intercept = **2**.

Why: In $y = mx + c$, the number multiplying x is m (gradient), and the standalone number is c (intercept).

6.2. Gradient calculation — subtracting coordinates in wrong order

✗ **Wrong:** Gradient = $(x_2 - x_1) / (y_2 - y_1)$

✓ **Right:** Gradient = $(y_2 - y_1) / (x_2 - x_1)$. **Change in *y* over change in *x*.**

Why: Rise over run. y goes on top. A common trick: 'gradient' starts with 'g' — so does 'go up first' (y-axis).

6.3. Reading scales incorrectly on graphs

✗ **Wrong:** Each small square = 1 (when actually each small square = 2 or 5).

✓ **Right:** **Always check the scale** on both axes before reading any values. Count the gridlines between labelled numbers.

Why: Misreading the scale is one of the most frequent errors in graph questions. It cascades into wrong gradient, wrong intercepts, wrong everything.

6.4. Function notation confusion

✗ **Wrong:** $f(3)$ means $f \times 3$.

✓ **Right:** $f(3)$ means '**substitute $x = 3$ into $f(x)$**'. If $f(x) = 2x + 1$, then $f(3) = 7$.

Why: $f(3)$ is not multiplication. It means 'evaluate the function at 3'. Replace every x with 3.

6.5. Not plotting enough points for curves

✗ **Wrong:** Plotting 3 points for $y = x^2 - 4x + 3$ and drawing a straight line.

✓ **Right:** Plot at least **7–8 points** for any curve. Join them with a smooth curve, not straight line segments.

Why: Curves need enough points to show their shape. Straight-line connections between points lose marks.

■ **Graphs Golden Rule**
Always use a table of values. For any curve, calculate y for at least 7 values of x, plot them accurately, and connect with a smooth curve. Never guess the shape.

7 Statistics & Probability Mistakes

Errors with data handling, probability, and statistical diagrams.

7.1. Probability answer outside 0–1 range

✗ **Wrong:** P(event) = 1.3 or P(event) = –0.2

✓ **Right:** If your probability is less than 0 or greater than 1, you have made an error. Go back and check.

Why: Probability must always be between 0 (impossible) and 1 (certain). Any other value is automatically wrong.

7.2. Writing probability as a ratio

✗ **Wrong:** P(red) = 3 : 7

✓ **Right:** P(red) = **3/10** (fraction, decimal, or percentage — never a ratio).

Why: Probability is expressed as a fraction, decimal, or percentage. Ratios compare parts to parts. Probability compares part to total.

7.3. Tree diagrams — adding along branches instead of multiplying

✗ **Wrong:** P(A and B) = 0.3 + 0.4 = 0.7

✓ **Right:** P(A and B) = 0.3 × 0.4 = **0.12**. Multiply along, add between.

Why: AND means multiply. OR means add. Along a branch = AND (multiply). Between final outcomes = OR (add).

7.4. Mean — dividing by wrong number

✗ **Wrong:** Total = 240 from 6 values. Mean = 240 / 5 = 48.

✓ **Right:** Mean = 240 / **6** = **40**. Divide by the **number of values**, not one less.

Why: Students sometimes confuse mean with other concepts or miscount the number of items.

7.5. Histogram — using height instead of area

✗ **Wrong:** Reading frequency directly from the y-axis height.

✓ **Right:** Frequency = frequency density × class width. The **area** of each bar represents the frequency, not the height.

Why: Histograms are not the same as bar charts. If class widths are unequal, height alone is meaningless.

7.6. Cumulative frequency — plotting at midpoints

✗ **Wrong:** Plotting cumulative frequency at the midpoint of each class.

✓ **Right:** Plot at the **upper class boundary** of each interval.

Why: Cumulative frequency shows how many values are up to a certain point — so you plot at the end (upper boundary) of each class.

7.7. Averages from frequency tables — not using frequencies

✗ **Wrong:** Adding the data values and dividing by the number of rows in the table.

✓ **Right:** Multiply each value by its frequency, add these products, then divide by the **total frequency**.

Why: Each row represents multiple data points. You must account for how many times each value occurs.

■ **Statistics Golden Rule**

Always check your totals. If a frequency table has a total of 60 and your mean calculation divides by 8 (the number of rows), something has gone wrong. The denominator should be 60.

CHECKLIST

Quick Self-Check Before Submitting

- ■ I have read every question at least twice.
- ■ I have shown my working on every question worth 2+ marks.
- ■ I have included units where the question uses them.
- ■ I have answered every part of every multi-part question.
- ■ I have not left any question blank — I have attempted everything.
- ■ I have checked my sign work in algebra (especially with negatives).
- ■ I have used radius (not diameter) in circle calculations.
- ■ My probability answers are all between 0 and 1.
- ■ I have checked my calculator is in DEGREE mode for trig questions.
- ■ I have given answers in the correct form (s.f., d.p., exact, simplified, etc.).
- ■ I have substituted my answers back to check they work.
- ■ I have not crossed out any work that might be correct.
- ■ I have written my name on the paper.

After Marking — My Top 3 Mistakes to Fix

1. _____
2. _____
3. _____

My Error Pattern Analysis

After marking, categorise each error. This tells you **what type of revision** you need.

Error Type	What It Means	How Many?	The Fix
Knowledge gap	Didn't know the topic		Learn the topic
Method error	Knew it, wrong approach		Practice questions
Careless slip	Knew it, just slipped up		Slow down + check
Reading error	Misread the question		Read twice, underline

Next Steps

- ■ Revisit any topic where I had a **knowledge gap**.
- ■ Do 5 extra practice questions for each **method error** topic.
- ■ Practise the **self-check checklist** after my next practice paper.
- ■ Visit **igcsegcsemaths.com** for topic-specific worksheets and guides.

"The student who eliminates avoidable mistakes is the student who gets the grade they deserve."