Course notes

SAT

Sat

Digital SAT, two-stage module-adaptive

Reading and Writing: 54 items, 64 minutes; Math: 44 items, 70 minutes. Two modules per section. Paper practice is nonadaptive and may have extra items (paper Test 11: 66 Reading/Writing, 54 Math). Use its own instructions and scoring ranges; use Bluebook for an adaptive rehearsal.

Official scope: https://satsuite.collegeboard.org/media/pdf/assessment-framework-for-digital-sat-suite.pdf

RW.I · Information and Ideas

- A central idea includes the author's main point, not just a vivid detail. Summarise each sentence before choosing.
- An inference joins stated information without adding a new cause. Check every word of an answer against the passage.
- For evidence questions, identify the claim first. A result can be real but irrelevant to that claim.
- For a table or graph, read labels, units and groups before values. Compare the requested groups; never infer a trend outside the data.

■ Checked example

A study measured two streets at noon. The shaded street was 29°C; the unshaded street was 33°C. This supports a difference of 4°C at those sites and time. It cannot establish city-wide cooling or causation because the streets may differ in other ways.

■ Common error

An answer that sounds scientifically plausible may add information absent from the passage.

RW.C · Craft and Structure

- Replace a tested word with your own plain phrase before viewing options. The sentence controls the meaning.
- Find what a sentence does: presents evidence, qualifies a claim, explains a method or introduces a contrast.
- Separate the author's view from a quoted view. Reporting a claim does not always endorse it.

- Cross-text questions ask about a relationship. Identify the exact point of agreement or disagreement, not the shared topic.

Checked example

Text 1: A small trial suggests the filter could help. Text 2: The trial is too small to establish effectiveness. Both allow that the trial is limited. Text 2 is more cautious about the conclusion; it does not say the filter certainly fails.

Common error

The everyday meaning of a word may differ from its meaning in the supplied sentence.

RW.E · Expression of Ideas

- Classify the relationship before choosing a transition: contrast, consequence, addition or example.
- Read both sides of a blank. A transition must link their meanings, not merely sound natural.
- For notes questions, underline the requested goal. Comparison, introduction and emphasis require different selections.
- Use only necessary notes. Keep names, dates and quantities attached to the correct object.

Checked example

Notes: Route A is 8 km and has six stops. Route B is 8 km and has ten stops. Goal: emphasise a similarity. "Both routes are 8 km long" meets the goal. Discussing stops emphasises a difference instead.

Common error

Do not include every note. Extra detail can distract from the requested rhetorical purpose.

RW.S · Standard English Conventions

- Find the finite verb and subject in each clause. A dependent clause cannot stand alone as a full sentence.
- Join two complete clauses with a full stop, semicolon, or comma plus a coordinating conjunction.
- A colon follows a complete clause. A semicolon joins complete clauses. Keep essential modifiers attached to what they describe.
- Check the head noun for agreement. "The list of measurements is long": list, not measurements, controls is.

■ Checked example

The sensor failed; the team replaced it. Each side has a subject and verb, so a semicolon works. “Because the sensor failed; the team replaced it” is wrong: because makes the first part dependent.

■ Common error

Long noun phrases hide the subject. Do not choose a verb merely to match the nearest noun.

M.A · Algebra

- Write a variable definition with units before an equation. The intercept represents an initial amount.
- A linear slope is change in output divided by change in input. Keep both quantities in the right order.
- Solve systems by substitution or elimination. A solution must satisfy both equations.
- An inequality reverses direction when multiplied or divided by a negative number. Test a value to check the final region.

■ Checked example

Let f be the fixed fee and r the cost per kilometre. f+3r=11 and f+7r=19. Subtract the equations: 4r=8, so r=2. Then f=11−3(2)=5. Both journeys fit; the fixed fee is 5.

■ Common error

The intercept is not always the actual starting value if zero lies outside the model’s stated domain.

M.Q · Advanced Math

- Factor a quadratic when possible. The zero-product rule applies to a product equal to zero.
- Completing the square reveals a vertex: $x^2-6x+5=(x-3)^2-4$.
- For rational expressions, record excluded denominator values before cancelling factors.
- An exponential model multiplies by a fixed factor per interval. A 20% increase means multiply by 1.2, not add 0.2.

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■ Checked example

Solve $x^2-5x+6=0$. Factor: $(x-2)(x-3)=0$. Thus $x=2$ or 3. If instead $(x^2-5x+6)/(x-2)=0$, $x=2$ is excluded; only 3 remains.

■ Common error

Squaring an equation can add extraneous roots. Substitute into the original equation, not just the transformed one.

M.D · Problem-Solving and Data Analysis

- Percent change uses the original value as the denominator. Percentage points compare percentages directly.
- Convert units explicitly. A rate denominator describes the amount of time or distance used.
- The median resists extreme values more than the mean. Spread describes variation, not the average.
- A random sample supports generalisation to its sampling population. Random assignment concerns causal comparison, a different issue.

■ Checked example

A price of 80 falls by 20%: $80\times0.8=64$. It then rises by 20%: $64\times1.2=76.8$. The final value is below 80 because the two percentage changes use different bases.

■ Common error

A sample from volunteers is not automatically representative, even when it is large.

M.G · Geometry and Trigonometry

- Similarity preserves corresponding angles and length ratios. Areas scale by k^2 and volumes by k^3.
- For a right triangle, sin is opposite/hypotenuse, cos adjacent/hypotenuse, and tan opposite/adjacent.
- A circle with centre (h,k) and radius r has $(x-h)^2+(y-k)^2=r^2$.
- A full turn is 360° or 2π radians. Arc length is $r\theta$ only when θ is in radians.

■ Checked example

A right triangle has legs 6 and 8. $c^2=6^2+8^2=100$, so $c=10$. For the angle opposite 6, $\sin\theta=6/10=0.6$. A similar triangle enlarged by factor 3 has area nine times the original.

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■ Common error

Radius and diameter differ by a factor of two. Using diameter in πr^2 makes the area four times too large.

ALG-parameters · Linear parameters, solution counts and inequalities

- Collect variable terms and constants separately. An equation ax+b=cx+d becomes (a-c)x=d-b. If a-c is nonzero there is one solution; if both sides reduce to zero there are infinitely many; if the variable coefficient is zero but the constant is nonzero there are none. Never divide by a parameter before checking whether it can be zero.
- A two-variable equation gives a set of ordered pairs. In y=mx+b, m is the change in y per unit x and b is y at x=0. For a contextual model, attach units to both: a taxi charge C=3t+5 has a 5-unit initial fee and 3 units per time unit. The intercept may be outside the practical domain even when it exists algebraically.
- For a system, compare both coefficients and constants. Multiplying one whole equation by a nonzero number produces the same line; matching variable coefficients with different constants gives parallel distinct lines. Otherwise an intersection supplies the pair satisfying both equations. Substitute the pair into both original equations to check it.
- Multiplying or dividing an inequality by a negative number reverses its direction. A strict inequality excludes the boundary, while $\leq$ or $\geq$ includes it. For two variables, draw the corresponding line and test a point away from it to identify the allowed half-plane. The diagram is a representation of all solutions, not a single preferred point.

■ Checked example

For kx+6=2x+6, k=2 gives 0=0 and infinitely many solutions; k$\neq$2 gives x=0. For -2x+3<11, subtract 3 and divide by -2 to get x>-4. For y$\leq$2x+1, (0,0) works and the solid boundary is included. The system 2x+4y=10 and x+2y=6 has no solution because doubling the second gives the same left side equal to 12, not 10.

■ Common error

Do not confuse x=0 with a vanished variable coefficient, reverse only when multiplying/dividing by a negative, or shade a half-plane from the line's slope alone.

AM-equivalence · Equivalent expressions and domain restrictions

- Expansion distributes each factor across the others; factorisation reverses that process. $x^2-5x+6=(x-2)(x-3)$, so the product form exposes zeros while the expanded form exposes coefficients. Choose the form that serves the question rather than treating one representation as always preferable.
- Cancel factors, never terms in a sum. $(x^2-4)/(x-2)$ becomes $x+2$ only for $x\neq 2$, because the original expression is undefined at 2. A restriction may remain after every denominator disappears from the simplified formula. State it before cancelling, then carry it through comparisons or equation solving.
- Exponent rules depend on their setting: $a^m a^n=a^{(m+n)}$ and $(a^m)^n=a^{(mn)}$ in the permitted real domain. Negative exponents form reciprocals and require nonzero bases. With real square roots, $\sqrt{(x^2)}=|x|$, because the principal square root is nonnegative; it is not x for every real x.
- To check equivalence, a numerical substitution can expose a mistake, but one matching value does not prove two expressions equal. A valid algebraic identity plus matching domain does. When the question requests a coefficient, expand only as far as needed and account for every contribution to that power.

■ Checked example

$(x^2-9)/(x-3)=(x-3)(x+3)/(x-3)=x+3$ for $x\neq 3$. At $x=3$ the original is undefined. For $x=-5$, $\sqrt{(x^2)}=5=|x|$. In $(2x+1)(x-4)$, the x coefficient is $-8+1=-7$ and the full expression is $2x^2-7x-4$.

■ Common error

A simplified formula is not automatically an equivalent function on a larger domain; cancelling terms across addition is invalid.

AM-equations · Nonlinear equations and mixed systems

- Use structure before expanding. A factored quadratic equals zero when at least one factor is zero. An absolute-value equation $|u|=a$ has no real solution for $a<0$, one condition $u=0$ when $a=0$ and two conditions $u=\pm a$ when $a>0$. Account for all allowed cases, not just the positive branch.
- For a rational equation, exclude denominator zeros before multiplying through. Multiplication may create a candidate at an excluded value. For a radical equation, note that a principal square root is nonnegative, isolate it and square carefully. Squaring is a one-way implication until every resulting candidate is checked in the original.

- To solve a line–parabola system, substitute the line expression into the quadratic. The real roots give x-values; use the line to recover each y. No real root means no real intersection. A repeated quadratic root gives tangency, while two different real roots give two intersections.
- A graph or calculator can help locate candidates and check scale, but rounded intersections are not exact proof when the question asks an exact value or solution count. Relate graphical behaviour to the algebraic equation. A double root should not be counted twice as two different ordered pairs.

■ Checked example

$\sqrt{(x+2)}=x$ requires $x\geq 0$. Squaring yields $x^2-x-2=0$, so $x=2$ or -1; only 2 works in the original. For $y=x+2$ and $y=x^2$, solve $x^2-x-2=0$: $x=2,-1$, giving $(2,4)$ and $(-1,1)$. For $|2x-1|=5$, solve $2x-1=5$ or -5 to obtain $x=3$ or -2.

■ Common error

Do not report every root of a transformed equation before checking the original restriction and branch.

AM-functions · Nonlinear functions, transformations and growth

- Vertex form $a(x-h)^2+k$ identifies the vertex (h,k) and opening direction; factored form identifies zeros. The same function can have both forms. In context, determine which features are meaningful: a maximum height occurs at the vertex of a downward parabola, while a zero can represent returning to ground level.
- For $y=A\,b^t$, A is the value at $t=0$ and b is the factor per unit time. A growth rate r gives $b=1+r$; decay gives $b=1-r$. Equal differences indicate a linear model, while equal ratios indicate an exponential model for equal input steps. Neither model should be extrapolated beyond a justified domain without a contextual reason.
- An output shift $f(x)+k$ moves every point vertically by k. An input shift $f(x-h)$ moves the graph right by h: the same old input is reached when the new x is larger. A multiplier outside scales output; a negative outside reflects across the x-axis. Determine the transformation algebraically instead of memorising a direction without checking a point.
- For an exponential factor given over several time units, distinguish that interval from one unit. Doubling every three hours means $2^{(t/3)}$, not 2^t. For a quadratic, use the requested representation to read an extremum or solve for an input. Keep initial values, growth factors and growth percentages separate.

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■ Checked example

h(t)=-4(t-3)^2+36 has a maximum 36 at t=3, with zeros t=0 and 6. N(t)=80(1.25)^t starts at 80 and grows 25% per unit; N(2)=125. A quantity doubling every three hours is 80 · 2^(t/3), so after six hours it is 320. If f(x)=x^2, f(x-2)+5 has vertex (2,5).

■ Common error

A 1.25 factor means 25% growth, not 125% growth; f(x-2) shifts right, and a repeated percentage uses the updated amount.

PSDA-rates · Ratios, unit conversion and successive percentages

- A ratio compares quantities in a chosen order. If red:blue=3:5 and the total is 64, the eight equal parts each contain eight, so red is 24 and blue 40. The ratio 3/5 describes red relative to blue; 3/8 describes red relative to the total. Read the requested denominator rather than using the first visible fraction.
- A unit rate divides quantity by its corresponding time, distance or count. Write conversion factors so unwanted units cancel: 72 km/hour times 1000 m/km divided by 3600 s/hour is 20 m/s. Area and volume conversions square and cube the length factor. A one-centimetre square is not one metre squared divided by one hundred.
- In direct proportion y=kx, doubling x doubles y; in inverse proportion xy=k, doubling x halves y. Constant work shared by identical workers gives an inverse time model only when productivity and conditions are fixed. A fixed initial fee added to a rate makes an affine linear model, not direct proportion through the origin.
- A percentage change divides the change by the original comparison base. Successive percentage changes multiply their factors: a 20% discount followed by 20% increase gives 0.8 · 1.2=0.96 of the original. Distinguish percentage points from relative percent: 30% to 36% is six points, but a 20% relative increase.

■ Checked example

A 250-unit price discounted 20% becomes 200; increasing that result 20% gives 240, four percent below 250. A pump delivers 18 litres in 3 minutes, so its rate is 6 L/min or 0.1 L/s. At a fixed rate, 45 litres takes 7.5 minutes. If a share rises from 40% to 50%, the rise is 10 percentage points and 25% relative to the old share.

■ Common error

State which amount is the percentage base and cancel units visibly. Equal positive and negative percentage changes use different bases.

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PSDA-spread · Distributions, transformations and spread

- The mean uses the sum of all observations divided by their count; the median is the middle of the ordered observations. Frequency means a value repeats: if 2 occurs three times and 8 once, the mean is $(3 \cdot 2+8)/4=3.5$, not $(2+8)/2$. The horizontal positions on a display are values and the frequencies determine how many observations they represent.
- The range is maximum minus minimum; standard deviation describes typical distances from the mean. You need not memorise a full formula to compare simple equally centred distributions: data clustered close to the mean have smaller standard deviation than data moved further away symmetrically. An outlier can alter mean and spread substantially while leaving the median stable.
- Adding c to every observation raises both mean and median by c but leaves range and standard deviation unchanged, because pairwise distances do not change. Multiplying every observation by a positive k multiplies mean, median, range and standard deviation by k. More generally spread scales by |k|, while a negative multiplier reverses ordering.
- When comparing plots, inspect the scale and the number of observations before judging apparent width. A graph stretched horizontally can look more variable without representing different values. A claim about equality of standard deviations needs the actual distributions, not merely equal ranges or equal means.

■ Checked example

A={4,5,6} and B={0,5,10} both have mean and median 5, but B has greater spread. Adding 7 gives A+7={11,12,13}, mean 12 and the same standard deviation as A. Multiplying A by 2 gives {8,10,12}; its mean is 10 and its range and standard deviation double. Equal range alone does not guarantee equal standard deviation.

■ Common error

Do not average distinct category labels when frequencies differ, or confuse a shifted distribution with a more spread-out one.

PSDA-models · Scatterplots, model residuals and predictions

- A scatterplot pairs two quantitative variables, one point per paired observation. A fitted line summarises a trend rather than connecting each point. In a model y=a+bx, b predicts the change in y for one-unit increase in x; its units are y-units per x-unit. The intercept a predicts y when x=0, which may lie outside the data range.
- A residual is observed y minus predicted y. Positive means the observation lies above the model; negative means below. Substitute the observed x into the model before subtracting. A large residual marks a poor prediction for that point, not automatically an error in measurement or proof that the trend is absent.

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- Interpolation predicts inside the observed x-range; extrapolation goes beyond it and needs stronger caution because the relationship may change. Use a model's contextual domain as well as its algebraic form. A negative predicted travel time, for example, can reveal an unjustified extrapolation rather than a physically possible outcome.
- For equal input steps, nearly constant output differences suggest a linear model; nearly constant output ratios suggest an exponential model. Scatter can make either pattern approximate. Association does not identify a cause: both variables may reflect a third factor. A fitted trend is evidence about prediction, not by itself about intervention.

■ Checked example

For study time x hours and predicted practice score y=12+3x, the slope is 3 score points/hour. At x=2 the prediction is 18. If the observed score is 21, residual=21-18=3. With x-values observed from 1 to 5, predicting at x=3 interpolates and x=12 extrapolates. Outputs 5,10,20,40 at equal input steps suggest factor-two exponential growth.

■ Common error

Keep observed minus predicted in that order. Do not turn a model slope into a causal treatment effect.

PSDA-conditional · Probability from a table and a restricted group

- A probability based on equally represented observations is favourable count divided by the relevant total. A two-way table has joint counts in cells, group totals on the margins and a grand total. Read whether the question asks about a joint event, either event or one event given another before choosing the denominator.
- For P(A given B), restrict attention to the B group and divide the A-and-B count by the B total. It is not generally equal to P(B given A), because the conditioning groups differ. A fraction with the correct numerator but the wrong population still answers the wrong question.
- The complement probability is 1-P(A). For either A or B, adding separate probabilities double-counts overlap, so subtract P(A and B). Disjoint events have no overlap; independent events satisfy P(A and B)=P(A)P(B). Two positive-probability disjoint events cannot be independent, since observing one rules out the other.
- For without-replacement draws, update both the remaining favourable count and total at each step. For independent repeated choices the probabilities multiply without that update. State the sampling assumptions before calculating. A table of observed relative frequencies supports empirical probabilities for that population, not a guarantee about every future draw.

■ Checked example

Original counts: bus users–18 carry a packed lunch, 12 do not; non-bus users–12 carry lunch, 8 do not. Total 50. P(lunch)=30/50=0.6; P(lunch given bus)=18/30=0.6; P(bus given lunch)=18/30=0.6 in this particular balanced table. Change one cell and these need not stay equal. P(bus and lunch)=18/50=0.36, equal here to $0.6 \cdot 0.6$, so the table shows independence of these categories.

■ Common error

Equal conditional answers in one table are coincidence or structure to check, not a universal rule. Condition first, then count.

PSDA-inference · Sampling, margin of error and causal claims

- A sample statistic estimates a population quantity. A reported estimate of 58% with margin of error 4 percentage points gives an interval from 54% to 62% under the stated procedure. It does not mean 58% of respondents answered with an error of four percent, nor does it guarantee that every individual sample contains the true value.
- A representative random sample helps generalise to the population from which it was drawn. Convenience or voluntary-response samples can be biased even when large. Increasing a well-designed sample generally reduces sampling variability and margin of error at the same confidence level, but cannot automatically cure a systematically excluded group.
- Random assignment distributes participants among treatment groups and supports causal inference by balancing competing factors on average. Random sampling selects who participates. A randomised experiment conducted only with volunteers may support a treatment effect for its participants without establishing that all people share the same effect.
- An observational study measures existing differences without assigning treatment; association can reflect confounding. A comparison of students who choose extra tutoring against those who do not may mix tutoring with motivation or prior attainment. To judge a claim, identify selection, assignment, comparison, measured outcome and the exact population before accepting causation or broad generalisation.

■ Checked example

A random sample of 400 school students yields 58% support ±4 percentage points: stated interval 54%–62%. This estimates the sampled school population, not all students worldwide. If volunteers are randomly assigned to two revision methods, a controlled outcome difference can support a causal comparison among participants; volunteer selection still limits wider generalisation.

■ Common error

Sample size, random selection and random assignment are not interchangeable. A narrow margin does not remove selection bias.

GT-scale · Scale factors, angle relationships and triangles

- For similar figures with length scale k, corresponding lengths scale by k, areas by k^2 and volumes by k^3. These laws apply when all corresponding dimensions change together. A cylinder with only radius doubled and fixed height has four times the volume, not eight times. State which dimensions are scaled before choosing the power.
- Use the correct geometric measure: triangle area is half base times perpendicular height; cylinder volume is base area times height. Surface area adds exposed faces, while volume measures enclosed space. A slant length is not automatically the perpendicular height required by an area formula. Attach square or cubic units to the result.
- Vertical angles are equal. For parallel lines cut by a transversal, corresponding and alternate interior angles are equal, and same-side interior angles sum to 180°. A triangle's interior angles sum to 180°; its exterior angle equals the sum of the two remote interior angles. These rules depend on stated or marked parallelism, not the drawing's appearance.
- Similar triangles share corresponding angles and proportional corresponding sides; congruent triangles also have equal corresponding lengths. Two angles establish similarity but not size equality. Maintain correspondence when writing a ratio. A side–side–angle arrangement does not universally guarantee congruence, whereas side–angle–side includes the angle between the two sides.

■ Checked example

Two similar solids have edge ratio 2:3, so surface-area ratio is 4:9 and volume ratio 8:27. A triangular garden with base 12 m and perpendicular height 5 m has area 30 m^2. If a triangle has interior angles 48° and 67°, its third is 65° and the adjacent exterior angle is 115°=48°+67°.

■ Common error

Use k^2 or k^3 only when the entire shape is scaled; do not infer parallel lines or a perpendicular height from an unmarked sketch.

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GT-circles · Circle equations, arcs and unit-circle trigonometry

- A circle with centre (h,k) and radius r satisfies $(x-h)^2+(y-k)^2=r^2$. For an expanded equation, complete the square in x and y and add the balancing constants to the other side. The resulting right side must be positive for a real nondegenerate circle. Keep the radius distinct from its square.
- A central angle θ in radians gives arc length $r\theta$ and sector area $r^2\theta/2$. In degrees, use the fraction $\theta/360$ of the full circumference or area. A full turn is 2π radians=360°. The formulas $r\theta$ and $r^2\theta/2$ require radians; inserting degrees without conversion gives a wrong scale.
- A tangent at a circle point is perpendicular to the radius there. An inscribed angle is half the central angle subtending the same arc; an angle subtending a diameter is a right angle. Identify the actual shared arc and centre before applying these statements. A chord is not a tangent and need not be perpendicular to a radius unless further conditions establish it.
- On the unit circle, a point at angle θ has coordinates $(\cos\theta,\sin\theta)$, so $\cos^2\theta+\sin^2\theta=1$. Signs depend on quadrant. For acute complementary angles, $\sin\theta=\cos(90°-\theta)$. Use special triangles for exact values: at 30° the sine is 1/2 and cosine $\sqrt{3}/2$; at 45° both are $\sqrt{2}/2$.

■ Checked example

$x^2+y^2-4x+6y-12=0$ becomes $(x-2)^2+(y+3)^2=25$, giving centre (2,-3), radius 5. For radius 6 and central angle $\pi/3$, arc length is 2π and sector area 6π. An inscribed angle on that same 60° arc is 30°. At 150°, cosine is $-\sqrt{3}/2$ and sine 1/2 because the point is in quadrant II.

■ Common error

Check degree/radian units, centre signs and whether an angle is central or inscribed before applying the formula.

RW-central · Central ideas, details and the scope of a claim

- Read for the passage's controlling relationship: a problem and response, a contrast, an explanation or a qualified claim. A topic label such as museum collections identifies the subject but not what the author says about it. State the main point in a short sentence before comparing options.
- A supporting detail illustrates, explains or qualifies that point. It may be memorable without being the central idea. If the passage gives two examples of improved access, a summary about only one example is too narrow. If it reports one collection, a conclusion about all collections is too broad.

- Preserve scope and certainty. Some, may and in this study are meaningful limitations. An answer can reuse the passage's vocabulary while changing its claim from possible to guaranteed. Check the answer's subject, action and qualification against the passage, not simply the number of shared words.
- When a question asks about a specific detail, answer that narrower task rather than choosing the central idea by habit. Locate the relevant sentence, read nearby context and distinguish what is directly stated from a proposed reason. Prior subject knowledge is unnecessary and should not supply missing evidence.

■ Checked example

Original passage: "The town archive digitised its most frequently requested maps first. Researchers could then inspect those maps remotely, reducing repeated handling of fragile originals. Staff continued to offer supervised access to items not yet scanned." Central idea: selective digitisation improved access and protection while physical access continued. "All maps became available online" overstates coverage; "the archive ended visits" contradicts the final sentence.

■ Common error

A true detail can still be a wrong main-idea answer. Watch for all, always and only where the passage makes a narrower claim.

RW-evidence · Choose evidence for a precise textual or numerical claim

- First translate the target claim into an evidence requirement. A claim that repeated practice helps retention needs information about retention under differing practice conditions, not simply a statement that learners enjoyed the activity. An interesting related fact may fail to support the specific relationship asserted.
- For textual evidence, identify whose claim is being tested and whether the task asks for support, challenge or completion. A quotation with familiar nouns is not enough. Ask what would become more credible or less credible if that detail were true, while preserving the passage's actual degree of certainty.
- For quantitative evidence, read title, axes or headers, units and groups before calculating. Use before/after differences when the claim concerns improvement, final values when it concerns outcomes and proportions when group sizes differ. A larger count can represent a smaller share in a larger group.
- A numerical pattern may support a descriptive comparison without proving why it occurred. If no random assignment or controlled causal evidence is stated, avoid a causal conclusion. The original table in this lesson is a hypothetical teaching dataset, not a published study; its purpose is to practise reading the relationship.

■ Checked example

Original hypothetical table: Group A has 20 learners, 12 correct before and 16 after; Group B has 40 learners, 24 correct before and 28 after. Both gain four correct responses, but A's correct share rises from 60% to 80% (20 points), while B rises from 60% to 70% (10 points). This supports "A had the larger percentage-point improvement", not "A had more correct final responses" or a causal claim about the method.

■ Common error

Use the quantity named by the claim. Raw counts, relative percentages and percentage-point changes answer different questions.

RW-inferences · Complete a passage with a warranted inference

- Separate the facts stated from the connection you must infer. If two observations establish a contrast, the conclusion should preserve that contrast. Write a short bridge linking the evidence before reading the options; this makes an attractive but unrelated explanation easier to detect.
- An inference need not copy a sentence verbatim, but each essential step must be supported. A passage saying a tool detects a feature missed by another supports a difference in detection, not that the first tool is superior for every purpose. Domain knowledge cannot fill an unstated requirement.
- Track qualifiers and alternative explanations. A pattern can suggest a possibility rather than establish certainty. If the passage acknowledges several possible causes, a completion blaming one cause exclusively is too strong. Check whether an option introduces new people, settings, motives or time periods.
- For a conclusion at the end of a short passage, inspect the logical transition: therefore requests a consequence, while however may introduce a limitation. A grammatically smooth continuation can still be logically unsupported. Prefer the option whose claims require the fewest unsupported assumptions while fully answering the task.

■ Checked example

Original passage: "Two sensors monitored the same bridge. Sensor A recorded brief vibrations that Sensor B did not register, but Sensor B operated successfully during colder periods when A stopped recording." Warranted conclusion: the sensors had complementary strengths under the observed conditions. It does not follow that either is universally more accurate or that temperature caused every difference in detection.

■ **Common error**

Do not turn observed co-occurrence into a unique cause or widen a limited comparison into universal superiority.

RW-words · Words in context: meaning, polarity and collocation

- A familiar word may have several senses. Substitute a simple paraphrase into the sentence and test whether it preserves the relationship. Context, rather than the first dictionary meaning, determines whether check means inspect, restrain or mark a response.
- For a blank, decide the needed meaning and polarity before looking at choices. A contrast introduced by but may reverse an expectation; an explanation after because can narrow the intended sense. If the sentence says evidence is promising yet incomplete, a word meaning cautious or provisional is more plausible than certain.
- Check grammatical fit and collocation as well as meaning. A verb must work with its object and complement; an adjective must modify the intended noun. A near synonym can fail if it implies a stronger degree, a different subject or a relationship the passage does not establish.
- Avoid treating difficult vocabulary as a contest to choose the most impressive word. Use a neutral paraphrase, eliminate options of the wrong polarity and then compare remaining shades of meaning. Keep a record of words learned in their full phrase, because context and typical combinations help later retrieval.

■ **Checked example**

Original sentence: "The committee gave the proposal qualified support: members approved its aim but requested a smaller trial before expansion." Here qualified means limited or conditional, not certified or skilled. Original blank: "Because the observations were few, the author described the conclusion as _____ rather than definitive." Provisional fits the explicit contrast with definitive.

■ **Common error**

A recognisable synonym may still carry the wrong strength or grammatical use. Do not ignore the explanation after the colon.

RW-structure · Text structure, sentence function and rhetorical purpose

- Summarise each part with an action: introduces a problem, describes an approach, presents evidence or notes a limitation. The ordered actions describe structure

more precisely than a list of subject nouns. Look for a shift where the author moves from background to a claim or from a claim to a qualification.

- For the function of a marked sentence, compare what comes before and after. If it contradicts an earlier expectation and the next sentence explains that surprise, its role may be to introduce an unexpected result. It is not automatically the author's conclusion just because it appears late.
- Purpose states what the author is trying to do with the information: explain a distinction, challenge an assumption, evaluate a method or describe a response. An option that merely names the topic is incomplete. An option that says persuade readers to take action needs actual advocacy, not an informative description alone.
- Distinguish an objection the author presents from a view the author endorses. Reported claims, examples and hypothetical situations can serve an argument without becoming the author's final position. Use the passage's wording and relationship markers to assign roles rather than imposing a favourite argument structure.

■ Checked example

Original passage: "Catalogues once grouped these objects by the material from which they were made. That approach placed tools with different uses together. The revised catalogue therefore adds a function label to each entry." Structure: describe an existing approach, identify its limitation, then explain a response. The middle sentence supplies the limitation motivating the revision; it does not claim material is irrelevant.

■ Common error

Do not confuse what a sentence is about with what it does, or turn a described method into a recommendation without textual support.

RW-cross-text · Compare two texts without merging their claims

- Build a brief claim record for each text: topic, position, evidence and limit. Keep the speakers separate. If Text 1 reports a possibility and Text 2 reports a concern, a response that makes both certain has altered both positions.
- Compare claims about the same relationship, not just shared vocabulary. Agreement may concern a benefit while disagreement concerns generalisation. One text may supply evidence absent from the other rather than directly contradict it. Identify exactly which proposition is supported, challenged or narrowed.
- When asked how one author would respond, use that author's reasoning and scope. Do not choose your preferred opinion or a compromise that neither text supports. A response can acknowledge the other text's evidence while resisting its broad conclusion if that matches the stated limitation.

- Check every clause of the answer. A choice may describe Text 1 correctly and misrepresent Text 2, or identify a real disagreement then exaggerate its importance. Trace each assertion back to its source. The final choice must accurately connect both texts, not merely summarise one.

Checked example

Original Text 1: "A trial in one gallery found that longer labels increased the time visitors spent at exhibits, suggesting that detailed labels can promote engagement." Original Text 2: "Time spent reading does not necessarily indicate deeper engagement; visitors may be trying to understand unclear wording." Text 2 would question whether time alone supports Text 1's engagement inference, not deny that the trial recorded more time.

Common error

Disagreeing with an interpretation is different from denying the observation. Keep each author's evidence and conclusion distinct.

RW-synthesis · Use research notes for the requested rhetorical goal

- Read the goal before the notes. Identify the action: introduce a subject, emphasise a similarity, contrast two cases, give an example or explain significance. Turn it into a brief requirement such as mention both objects and their different materials. This determines which facts matter.
- Select details that carry out that action. Accurate but irrelevant information can still fail the question. For a contrast, both compared objects and the relevant difference should be present; for a similarity, a shared property should be explicit. Do not assume that including more notes makes a stronger sentence.
- Preserve relationships when combining facts. Notes saying a researcher visited a site and later published a book do not prove the visit caused the book. Avoid adding evaluative language such as revolutionary or superior unless the notes support it. Keep time, identity and numerical facts consistent.
- Compare answer choices against both goal and factual accuracy. A sentence can meet the goal while misreporting a detail, or be fully accurate while answering a different goal. The correct choice must satisfy both conditions. Clear referents and concise structure help make the requested relationship explicit.

■ Checked example

Original notes: Project Alder used recycled wood; Project Birch used clay; both were temporary outdoor installations; Alder opened in May; Birch opened in June. Goal: emphasise a difference in materials. Suitable synthesis: "Although both were temporary outdoor installations, Alder used recycled wood whereas Birch used clay." Opening months are accurate but unnecessary for this goal.

■ Common error

Do not mistake a factually accurate sentence for one that satisfies the rhetorical goal. Avoid unsupported causal or evaluative additions.

RW-transitions · Transitions: choose the logical relationship first

- Temporarily ignore the blank and state how the two ideas relate. Does the next sentence add another instance, give a result, present an example, correct an expectation or shift to a different topic? A short label such as contrast is more useful than choosing a familiar connective immediately.
- Consequential transitions such as therefore need a supported result. However and nevertheless introduce contrast or concession, while for example introduces an instance of a broader claim. Similarly compares a matching relationship, not merely two sentences mentioning the same noun. Use the meaning of both sides, including negatives.
- A concession acknowledges a point while maintaining a different conclusion. "The route is shorter; nevertheless, it takes longer at rush hour" contrasts distance with travel time. In fact can strengthen or correct a statement; it is not a generic substitute for additionally. Test the chosen word by paraphrasing the relationship aloud.
- Logical correctness does not remove sentence-boundary rules. However is not a coordinating conjunction joining independent clauses with a comma alone. In a transition question, supplied punctuation may already be fixed; in an editing task, punctuation also needs checking. Keep these two decisions distinct.

■ Checked example

Original passage: "The new device is smaller than its predecessor. However, it requires more frequent charging." The second sentence limits an expected benefit; therefore would incorrectly make frequent charging a logical result of small size without evidence. "Several birds use tools. For example, one species uses twigs to retrieve food" moves from a general claim to an instance.

■ Common error

Shared subject matter does not decide the link. Do not choose therefore unless a consequence is actually supported.

RW-boundaries · Sentence boundaries, colons and nonessential information

- An independent clause has a subject and finite predicate and can stand as a sentence. A dependent clause introduced by although, because or when cannot stand alone in that role. Identify the clause structure before choosing punctuation; a long clause is not necessarily complete and a short one may be.
- Two independent clauses can be separated by a period or semicolon, or joined with a comma and coordinating conjunction such as and or but. A comma alone creates a splice. A conjunctive adverb such as however does not replace the coordinating conjunction: use "The test was brief; however, it was demanding."
- A colon can introduce an explanation, example or list after a complete independent clause. Do not place it between a verb and its direct object or after a preposition introducing its object. "The box contains three tools: a ruler, a compass and a square" has a complete introductory clause; "The tools include: a ruler…" improperly interrupts the include construction.
- Nonessential material can be enclosed by matching commas, dashes or parentheses, while essential identifying material should not be separated in that way. Removing a nonessential insertion leaves the core sentence intact. Watch both boundaries of an insertion and avoid placing a comma between the subject and main verb merely because the subject is long.

■ Checked example

Original: "The catalogue was incomplete; however, the surviving entries were useful." Both clauses are complete; the semicolon separates them and however is followed by a comma. "The team chose one method: a supervised trial" uses a colon after a complete clause. "The catalogue, revised last year, includes new photographs" encloses a removable modifier with two commas.

■ Common error

Punctuation follows structure, not a pause imagined while reading. A comma before however does not by itself repair two independent clauses.

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RW-form · Agreement, verb forms, modifiers and logical parallelism

- Find the head of the subject rather than agreeing with the nearest noun. A singular collection takes is even when a following of-phrase contains plural maps. A pronoun must agree with and clearly refer to its antecedent. If two possible antecedents make a pronoun ambiguous, a precise noun can restore the intended reference.
- Choose verb tense from the surrounding timeline and logical relationship, not an isolated word. A completed event at a stated past time normally takes a past form. Perfect forms can mark an event before another reference time. An infinitive or participle is not automatically a finite verb and cannot alone supply the main predicate.
- An introductory modifier must attach to the appropriate subject. "Walking through the gallery, Maya noticed the new labels" makes Maya the walker. "Walking through the gallery, the labels attracted Maya" incorrectly makes the labels walk. Identify the performer of the introductory action, then check the main subject.
- Parallel structures put comparable ideas into compatible grammatical forms: "to collect, to classify and to display" or "collecting, classifying and displaying". A comparison must compare like things, such as one museum's hours with another's hours, not hours with a museum. Meaning and structure work together; a grammatically shaped choice can still create an illogical reference.

■ Checked example

Original agreement: "The list of proposed changes includes a longer opening period." List is singular, so includes is correct. Modifier repair: "After examining the samples, the researchers revised their prediction." Researchers examine; a version beginning "After examining the samples, the prediction…" dangles. Parallel repair: "The team aimed to record, analyse and publish the findings."

■ Common error

Do not agree with a noun inside a prepositional phrase or let an introductory action attach to an inanimate subject that cannot perform it.