

Notes

ACT · ACT · ACT

Act

Enhanced ACT; international content from February 2026

English 50/35 min; Math 45/50 min; Reading 36/40 min. Science optional 40/40 min; Writing optional 1/40 min. Composite uses English, Math and Reading. Official keys exclude field-test items from raw-score conversion.

Official scope: <https://www.act.org/content/dam/act/unsecured/documents/R2519-Design-Framework-for-the-ACT-Enhancements-2026-02.pdf>

E.P · English: purpose, organisation and style

- English questions assess the passage as a whole. Read the surrounding sentences before judging a local change.
- For an add-or-delete question, name the paragraph's purpose and test whether the proposed detail advances it.
- For placement, follow references and time order. A sentence using “this method” needs the method introduced first.
- Concise wording removes repetition without deleting a necessary meaning. Preserve the register and viewpoint of the passage.

Checked example

A paragraph explains how engineers inspect cracks. “The team used a camera to record the cracks” supports the method. “The team enjoyed the café nearby” adds no inspection detail and should be omitted. This is a relevance decision, not a grammar decision.

Common error

The shortest answer is not always correct: it can remove a needed contrast, cause or identifying detail.

E.C · English: conventions and punctuation

- An opening participle phrase modifies the subject that follows. Put the actual walker in that position.
- Use commas for nonessential information; do not separate a subject from its verb.
- Parallel lists keep a common grammatical form: reading, planning and drafting.
- For pronouns, check both number and clear reference. An unclear they can refer to two different groups.

Checked example

Repair the dangling modifier: “While I was walking to school, rain began.” The dependent clause now names the walker. For parallelism, “She enjoys reading, to draw and swimming” becomes “She enjoys reading, drawing and swimming.”

Common error

Read the complete sentence after replacing the underlined text. A choice may create a new boundary error.

M · Mathematics: models, functions and higher maths

- Preparing for higher mathematics covers number, algebra, functions, geometry and statistics/probability. Essential skills combine rates, units and proportions.
- For a function, track the input and output. Composition applies the inner function first.
- Coordinate geometry links slopes, distances and equations. Right-triangle ratios require the correct reference angle.
- Model a context with stated assumptions, then check whether the result is sensible. A calculator supports computation but cannot choose a model for you.

Checked example

If $f(x)=2x+1$ and $g(x)=x^2$, then $f(g(3))=f(9)=19$. But $g(f(3))=g(7)=49$. Order matters. For a probability check, two independent fair coin tosses give $P(\text{two heads})=1/2 \times 1/2=1/4$.

Common error

Enhanced ACT maths uses four answer choices. A five-choice older item can teach a skill but should not define current test pacing.

R · Reading: details, structure and integration

- Map a longer passage by paragraph roles: setting, claim, evidence, objection or resolution.
- Locate an answer's evidence before selecting it. An inference must be supported even if no sentence states it directly.
- Separate a character's belief from the narrator's view. Tone emerges from wording and context.
- In paired passages, compare the authors on the question's shared issue. For a graphic, verify that the visual supports the precise claim.

Checked example

Passage A values a museum because it protects objects. Passage B values it because it invites debate. Both can favour museums while offering different reasons. An answer claiming that B opposes all preservation would go beyond the evidence.

Common error

Do not choose an answer merely because it repeats a passage word. The relationship between ideas must also fit.

S · Optional Science: data, investigations and models

- Identify the independent and dependent variables, axes and units. Interpolate only within the supplied data range.
- Find which factor changes between trials and which factors remain controlled. Replication tests repeatability.
- For conflicting viewpoints, write one prediction for each model and look for a discriminating observation.
- Use the supplied scientific context. Many questions require evidence reasoning rather than recall of a specialist fact.

Checked example

Trial 1 uses 10 mL acid and takes 40 s; Trial 2 uses 20 mL and takes 25 s at the same temperature. More acid is associated with a shorter time here. A third trial at a hotter temperature cannot isolate the acid-volume effect.

Common error

Science is optional for individual ACT registrations, but a school contract or target institution may require it. It is not part of the enhanced EMR Composite.

W · Optional Writing: perspectives and argument

- The optional ACT Writing task gives an issue and three perspectives, with 40 minutes for the complete essay. Develop your own position and analyse its relationship to at least one supplied perspective. You may adopt, qualify or challenge a supplied view. Your stance itself is not a reason for a higher score; the quality of the argument matters.
- Separate agreement about the goal from agreement about the method. Identify a perspective's assumption, likely benefit and limitation. A relationship statement should say where your position agrees or differs and why. Do not spend the essay merely restating the three views, or assume that listing all three amounts to analysis.
- Development connects a reason to a specific example and explains its implications. A hypothetical example is acceptable as reasoning practice when it is clearly hypothetical; do not invent statistics and present them as measured evidence. Respond to a serious objection, including the conditions under which it would matter. A qualified policy can be stronger than an absolute claim unsupported by its examples.
- Organise paragraphs around the argument's needs: position, developed reasons, engagement with another perspective and a coherent conclusion. This is a possible structure, not an official paragraph-count rule. A suggested practice budget is 6 minutes to plan, 29 to draft and 5 to revise; adjust it after timed trials. Revision checks reasoning, connections, precise wording and sentence control. Local checks teach these moves; the complete essay requires teacher review across four domains and is not exact-string graded or converted into an invented official score.

Checked example

Original issue: should a community learning centre require advance booking for all equipment? Perspective 1: required booking reduces queues and makes schedules predictable. Perspective 2: open access lets people respond to needs that arise unexpectedly. Perspective 3: a combined system should reserve some capacity while

preserving walk-in access. A defensible position is to reserve high-demand machines in peak hours and leave a portion available for walk-ins. This agrees with predictability as a goal but limits compulsory booking because urgent repairs cannot always be planned. Model development: “A resident whose only printer fails before an interview needs access that evening. If every slot must have been reserved yesterday, a nominally fair rule prevents an urgent use. Keeping one walk-in slot per hour would protect such access, though staff would need a clear queue rule to avoid arbitrary exceptions.” The example explains the policy’s mechanism and trade-off; it does not establish a universal optimal percentage.

Common error

Mentioning a perspective without analysing its relationship to your argument is not enough.

N-real-complex · Real numbers, rational powers and complex arithmetic

- A rational number is a ratio of integers with nonzero denominator; a terminating or repeating decimal is rational. An irrational real number is not such a ratio. Closure of rational numbers under addition and multiplication does not imply closure of irrational numbers. Exact roots may simplify: $\sqrt{18}=3\sqrt{2}$ remains irrational, whereas $\sqrt{16}=4$ is rational.
- For a positive base, $a^{\frac{m}{n}}$ combines an n th root and an integer power. A negative exponent forms a reciprocal and requires a nonzero base. Distinguish $\sqrt{x^2}=|x|$ from x . When an even root is involved, respect the real domain and the principal nonnegative root. Distribute powers across products, not across sums: $(a+b)^2$ includes the cross term.
- Complex arithmetic uses $i^2=-1$. Add real parts and imaginary parts separately, and multiply by distribution before reducing i^2 . To divide by $a+bi$, multiply numerator and denominator by $a-bi$; the resulting denominator is a^2+b^2 when the original is nonzero. Complex roots permit solutions to equations such as $x^2=-9$ that have no real roots.
- Enhanced ACT still includes selected advanced topics, and no formula sheet is supplied. Build familiarity with the defining rules rather than guessing from a calculator display. Check whether the question asks for real or complex solutions, an exact radical or a decimal approximation. The local checks here are formative, not an official scored form.

Checked example

$16^{3/4}=2^3=8$. $(2+3i)(1-2i)=2-4i+3i-6i^2=8-i$. For $(1+i)/(1-i)$, multiplying by $1+i$ gives $(1+i)^2/2=2i/2=i$. The solutions of $x^2+9=0$ are $\pm 3i$; neither is real.

Common error

Do not infer that two irrational terms must have an irrational sum, distribute a square over addition, or replace $\sqrt{x^2}$ by x when x can be negative.

N-vectors-matrices • Vectors and matrices as organised quantitative models

- A two-dimensional vector records an ordered displacement or another paired quantity. Add corresponding components and multiply both by a scalar. The vector from A to B is B-A, not A-B. Its magnitude is $\sqrt{u^2+v^2}$ in a Euclidean coordinate plane; direction and magnitude are different pieces of information.
- A matrix organises entries into rows and columns. Add only matrices of the same shape, entry by entry. For multiplication, the number of columns in the first factor must equal the number of rows in the second. A 2-by-3 matrix times a 3-by-1 vector produces a 2-by-1 result: each output is one row's dot product with the vector.
- Order matters: matrix multiplication is generally not commutative. If A times B is defined, B times A may be undefined or produce a different result. For a row containing item quantities and a column containing unit prices in the same item order, the dot product gives the total cost. A mismatched item order produces a numerically neat but meaningless answer.
- Label each component and unit before calculating. A displacement vector uses distance units, while a matrix entry may be a count, cost or rate. After multiplication, interpret the output's units. ACT problems may supply the operation definition; follow that definition rather than assuming an unfamiliar symbol always means ordinary multiplication.

Checked example

Displacements (3,4) and (-1,2) sum to (2,6); the first has magnitude 5. Two shopping rows (2,1) and (1,3), with prices (4,5), give costs $2 \cdot 4 + 1 \cdot 5 = 13$ and $1 \cdot 4 + 3 \cdot 5 = 19$. The matrix $\begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$ times column $\begin{bmatrix} 4 \\ 5 \end{bmatrix}$ is column $\begin{bmatrix} 13 \\ 19 \end{bmatrix}$. Entries represent counts times price per item.

Common error

Keep row/column shape and item order explicit. A vector's magnitude is not the sum of its components.

A-polynomial · Linear, quadratic and polynomial relationships

- Translate relationships into expressions before manipulating them. A fixed fee plus a per-unit charge is an affine linear model, while a product of dimensions can create a quadratic. An equivalent form should preserve the original expression on its domain. Factor common terms and recognise identities before expanding every product.
- A linear equation can have one, no or infinitely many solutions after simplifying; check zero coefficients before dividing. Multiplying or dividing an inequality by a negative reverses its direction. A polynomial product equals zero when at least one factor is zero. Keep all factors, including an extracted x , to avoid losing a zero root.
- A quadratic's factored form exposes roots and its vertex form exposes an extremum. For an inequality, order the real roots and test the sign in each interval. Include boundaries only for $\leq$ or $\geq$. A parabola opening upward is negative between two distinct real roots and positive outside them.
- Use substitution into the original relation to check candidate values. An expanded coefficient question may require combining several contributions to the same power. A degree-three polynomial need not require a general cubic formula: a common factor or known root can reduce it to simpler factors. Choose the method based on structure.

Checked example

$x^2-5x+6=(x-2)(x-3)$, so $x^2-5x+6<0$ gives $2<x<3$. $x^3-4x=x(x-2)(x+2)$, giving roots $-2,0,2$. The expression $2(x-3)^2+5$ has minimum 5 at $x=3$. In $(2x+1)(x-4)$, the x coefficient is $-8+1=-7$.

Common error

Do not omit an extracted factor, include a strict-inequality boundary, or report a vertex x -coordinate when the question asks for the minimum value.

A-radical-systems · Rational equations, radical branches and systems

- For rational expressions, identify denominator zeros before cancelling factors or multiplying an equation by a denominator. Simplification may remove a visible factor while its original restriction remains. Cancel whole factors, not selected terms in an addition.
- Isolate a square root and respect its nonnegative value before squaring. Squaring preserves solutions but can add candidates, so substitute each candidate into the original. The same caution applies to multiplying by an expression that might be zero. A value that satisfies a transformed polynomial but fails the source is extraneous.
- A system requires the same ordered pair to satisfy every equation. Substitute a line into a circle or parabola, solve the resulting quadratic and recover the second coordinate. Linear systems may have one intersection, no intersection or coincident lines. Do not confuse two algebraic roots with two separate systems.
- For systems of inequalities, each condition supplies an allowed region and the solution is their intersection. A point on a strict boundary is excluded even if it satisfies the other inequality. Verify a proposed point by substituting into each original inequality, including its equality sign.

Checked example

$\sqrt{x+6}=x$ implies $x \geq 0$. Squaring gives $x^2-x-6=0$ with candidates 3 and -2; only 3 works. For $x^2+y^2=25$ and $y=x+1$, substitution gives $x^2+x-12=0$, hence (3,4) and (-4,-3). $(x^2-4)/(x-2)$ simplifies to $x+2$ for $x \neq 2$, preserving the restriction.

Common error

Restrictions survive simplification. In a simultaneous system, check both coordinates in every original relation.

F-compose · Functions, composition, transformations and inverses

- A function gives one output for each allowed input. A graph passing a vertical line at two different output points is not a function of x . Domain lists allowed inputs; range lists attained outputs. Convert a table to a rule only when the relationship is supported, and interpret each variable's role.
- In $f(g(x))$, the inner function g acts first and its output must be in f 's domain. For $f(u)=1/(u-1)$ and $g(x)=x^2+1$, composition gives $1/x^2$ and excludes $x=0$. Domain

checking belongs to the original functions as well as the simplified result.

- An output change $f(x)+k$ shifts vertically by k ; $f(x-h)$ shifts right by h . An outside multiplier changes output scale, while an inside multiplier changes how quickly the input reaches old points. Identify a known point to verify the transformation instead of guessing direction from a sign.
- An inverse exchanges input and output and requires a one-to-one relationship on the chosen domain. Solve $y=f(x)$ for x , then exchange names. A quadratic must usually be restricted to one side of its vertex. The inverse function f^{-1} is not the reciprocal $1/f$. Check composition in both directions on the allowed domain.

Checked example

$f(x)=2x+3$ and $g(x)=x^2$ give $f(g(x))=2x^2+3$, but $g(f(x))=(2x+3)^2$. For $h(x)=(x-2)^2$ restricted to $x\geq 2$, the inverse is $2+\sqrt{x}$ with domain $x\geq 0$. A vertical shift of h by 4 has vertex $(2,4)$; the unrestricted quadratic would not have a single-valued inverse.

Common error

Preserve composition order and the restricted inverse branch. Superscript -1 in function notation does not mean a reciprocal.

F-series-logs · Sequences, finite sums, exponentials and logarithms

- An arithmetic sequence has constant difference d : $a_n=a_1+(n-1)d$. Its finite sum is $n(a_1+a_n)/2$. A geometric sequence has constant ratio r : $a_n=a_1r^{(n-1)}$. For $r\neq 1$, a finite sum is $a_1(1-r^n)/(1-r)$; when $r=1$ it is simply $n a_1$. Match the requested term or total.
- An exponential model $A b^t$ represents multiplication by b per stated time unit. A percentage growth r uses factor $1+r$; repeated changes multiply factors rather than adding percentages. If doubling takes several time units, divide t by that interval in the exponent.
- For base $b>0$ with $b\neq 1$, $\log_b(a)=c$ means $b^c=a$ and requires $a>0$. Solve a logarithmic equation by translating it to an exponential relationship, then check the argument. Logarithms of products add under valid positive arguments; logarithms do not distribute over addition.
- Use exact powers when available. ACT may test a simple logarithmic relationship without requiring numerical logarithm tables. A calculated approximation must still respect the question's representation and domain. Keep a sequence's index, an exponential model's time and a logarithm's argument conceptually separate.

Checked example

Arithmetic 4,7,10,... has $a_5=16$ and sum of first five $=5(4+16)/2=50$. Geometric 3,6,12,24 has four-term sum 45. $\log_2(x-1)=4$ gives $x-1=16$, so $x=17$, which satisfies $x>1$. A population $50 \cdot 2^{(t/3)}$ reaches 200 after six time units.

Common error

Do not use n rather than $n-1$ for the n th term, confuse a finite sum with its last term, or expand $\log(a+b)$ as $\log a + \log b$.

F-trigonometry · Trigonometric graphs, identities and general triangles

- For a right triangle, $\sin$ is opposite/hypotenuse, $\cos$ adjacent/hypotenuse and $\tan$ opposite/adjacent relative to a chosen angle. Similar triangles explain why these ratios depend on angle rather than size. On the unit circle, coordinates are $(\cos \theta, \sin \theta)$, extending the ratios to other quadrants with appropriate signs.
- $\sin^2 \theta + \cos^2 \theta = 1$ and $\tan \theta = \sin \theta / \cos \theta$ when $\cos \theta \neq 0$. For $y = A \sin(Bx) + D$ with radian x , amplitude is $|A|$, period $2\pi/|B|$ and midline D . A negative A reflects the wave; D shifts it vertically. Check whether the input is in radians or degrees before using a graph interval.
- For a general triangle, the cosine rule $c^2 = a^2 + b^2 - 2ab \cos C$ uses the included angle C between a and b . The sine rule compares each side with the sine of its opposite angle. Area is $ab \sin C/2$ when two sides and their included angle are known. Choose the relationship matching the supplied information.
- Do not infer a right angle from the sketch. A sine-based equation may allow more than one angle in a permitted interval; retain the quadrant information and any triangle sum condition. Keep amplitude distinct from total peak-to-trough distance, which is twice the amplitude.

Checked example

$y = 3 \sin(2x) + 1$ has amplitude 3, period π and values between -2 and 4. A triangle with sides 5 and 7 around a 60° angle has third side $\sqrt{(25+49-70 \cdot 1/2)} = \sqrt{39}$ and area $35\sqrt{3}/4$. At 150° , sine is $1/2$ and cosine $-\sqrt{3}/2$.

Common error

State angle units and identify the included angle. The highest value is midline plus amplitude, not the amplitude alone.

G-plane · Plane transformations, coordinate reasoning and proof

- A translation adds a displacement to each point; reflection across the x-axis sends (x,y) to $(x,-y)$. A 90° counterclockwise rotation around the origin sends (x,y) to $(-y,x)$. These rigid motions preserve lengths and angles. Dilation by factor k about the origin scales coordinates and lengths by k when k is positive, preserving shape but generally changing size.
- Distance between two points follows the Pythagorean theorem: square the coordinate differences, add and take the root. The midpoint averages each coordinate. Slope compares vertical and horizontal change; perpendicular nonvertical slopes have product -1 . Vertical and horizontal lines require separate treatment rather than division by zero.
- A geometric argument starts from stated or marked conditions. Vertical angles are equal; parallel lines give corresponding and alternate-angle relationships. Triangle angles sum to 180° . SSS, SAS and ASA/AAS can establish congruence with proper correspondence, while two equal angles establish similarity but not equal size.
- Construction reasoning uses a compass to transfer lengths and draw equal-radius arcs. An intersection of equal-distance arcs can locate a perpendicular bisector; it is not a guessed midpoint from a sketch. Coordinate evidence can support a proof, but one specially chosen picture does not establish a general statement for every triangle.

Checked example

Point $(2,-1)$ translated by $(3,4)$ becomes $(5,3)$; rotated 90° counterclockwise about the origin it becomes $(1,2)$. Between $(1,2)$ and $(7,10)$, distance is $\sqrt{6^2+8^2}=10$ and midpoint $(4,6)$. Two triangles with matching side lengths 3,4,5 are congruent by SSS; triangles with equal angles may instead differ by scale.

Common error

Follow the specified centre and order of transformations. Do not use a visually parallel or perpendicular pair as a stated condition.

G-conics · Conics, circle relationships and geometric measurement

- A circle has form $(x-h)^2+(y-k)^2=r^2$. An ellipse uses two positive squared terms divided by squared semiaxes; a hyperbola has a difference of such terms. A parabola

has one squared coordinate in its standard aligned form. In $y^2=4px$, the vertex is the origin and the focus is $(p,0)$; read the sign and axis before interpreting direction.

- For $(x-1)^2/9+(y+2)^2/4=1$, centre is $(1,-2)$, horizontal semiaxis 3 and vertical semi-axis 2. Complete the square when the centre is hidden in an expanded circle. An equation's coefficients and signs distinguish conic types; a rough sketch does not supply missing algebraic information.
- A tangent is perpendicular to the radius at contact. An inscribed angle is half the central angle subtending the same arc. For two secants from the same exterior point, outside segment times whole secant is equal for both; a tangent length squared equals that product. Whole length includes the outside portion, so do not multiply outside and inside alone.
- Separate boundary measures from space measures. Circle circumference is $2\pi r$ and area πr^2 ; cylinder volume is $\pi r^2 h$; cone volume is $\pi r^2 h/3$; sphere volume is $4\pi r^3/3$. Surface area sums exposed faces. If all corresponding lengths scale by k , area scales by k^2 and volume by k^3 ; changing only one dimension needs the original formula.

Checked example

The ellipse $(x-1)^2/9+(y+2)^2/4=1$ has horizontal endpoints $(-2,-2)$ and $(4,-2)$. $y^2=8x$ has $p=2$ and focus $(2,0)$. Secants with outside/whole lengths $3/12$ and $4/9$ both have product 36, so a tangent from the same point has length 6. A cone radius 3, height 8 has volume 24π .

Common error

Take square roots for radii and semiaxes; use entire secant lengths and cubic units for volume.

S-data · Data displays, normal distributions and association

- The mean weights all observations; the median uses their ordered middle. A histogram groups numeric values into intervals, a box plot displays quartiles and a bar chart compares categories. Inspect units, scale and frequencies before comparing apparent width or height. Use the task's stated quartile convention where calculation is required.
- Adding a constant shifts mean and median but leaves standard deviation unchanged; multiplying values by a positive factor scales both centre and spread. For a normal model, the mean is at the symmetric centre; approximately 68% lie within one standard deviation and 95% within two. These approximations concern a stated normal model, not every vaguely symmetric dataset.

- A scatterplot pairs quantitative measurements. A fitted line predicts a response; a residual is observed minus predicted. A two-way table instead compares categories and conditional shares. A trend can show association without proving cause, because other variables or selection may explain the relationship.
- An informal fitted line should follow the main trend, not join every point. Describe direction, shape and unusual points. Interpolation inside the observed range is better grounded than distant extrapolation. Changes in graphical scale can make an unchanged relationship look stronger or weaker, so read the actual coordinates and axes.

Checked example

A normal-model score distribution with mean 50 and standard deviation 5 places about 68% between 45 and 55 and about 95% between 40 and 60. Adding 10 shifts the mean to 60 but keeps standard deviation 5. For $y=2x+4$ at $x=3$, predicted $y=10$; an observed value 12 gives residual $+2$. These are hypothetical teaching models.

Common error

Do not use normal percentages without a normal-model condition or interpret a scatterplot slope as an automatic causal effect.

S-inference-probability · Sampling inference, expected value and counting

- A random sample supports inference to its source population; a margin of error gives a sampling-uncertainty interval around an estimate. Random assignment instead supports a causal treatment comparison. In a simulation, a result rarely produced under a claim can be evidence against that claim; failure to find an unusual result does not prove the claim true.
- Conditional probability restricts the denominator to the conditioning group. For either A or B, subtract their overlap after adding separate probabilities. Independence permits multiplication of unchanged probabilities; without-replacement draws require updated counts. Expected value is the sum of each possible outcome times its probability, not necessarily an outcome achieved in one trial.
- Use the multiplication principle for successive choices. For n distinct objects, choosing r in order gives $n!/(n-r)!$; choosing an unranked set gives $n!/r!(n-r)!$. Dividing by $r!$ removes the multiple orderings of the same set. These formulas assume distinct objects and no replacement; different conditions need a corresponding count.
- Translate the event to a count before calculating its probability. If a favourable event can occur in several disjoint ways, add those ways; if paths overlap, avoid

double-counting. A numerical answer must be between zero and one for a probability, while an expected cost or score has the units of the outcomes.

Checked example

From five students, captain/deputy pairs number $5 \cdot 4 = 20$; unranked pairs number $5 \cdot 4/2 = 10$. A game awards 4 points with probability $1/4$ and 0 otherwise, so expected award is 1 point per play. A sample estimate $52\% \pm 3$ percentage points gives $49\% - 55\%$; it is not a guarantee about every sample or individual.

Common error

Order, replacement and conditioning change the calculation. Failing to reject a statistical claim is not proving it true.

IES-models · Essential skills in a multi-step practical model

- Define variables with units and translate each part of the situation. A fixed fee plus a rate gives $C = b + md$; direct proportion $C = md$ applies only when the intercept is zero. Ratios compare quantities in a chosen order, and successive percentage changes multiply their changing bases. A model should preserve those relationships before any arithmetic begins.
- Convert units by multiplying factors that cancel. For scale models, length factors square for area and cube for volume when every dimension is scaled. Combining a geometric formula with a unit price can model material cost; for example, paint area times cost per square metre gives currency, while using wall volume would have the wrong physical meaning.
- Interpret and test the model. Ask whether a constant rate is plausible across the domain, whether a fixed charge is already included and whether an estimated area excludes doors or overlap. Compare a prediction with observed data and identify which assumption or parameter may need revision. A model's neat algebra does not establish that it fits reality.
- Improve a model by adjusting the parameter supported by evidence. If every predicted bill is exactly two units low, revising the fixed fee may fit better than changing the per-distance slope. A trend in errors with distance points toward the rate instead. Keep modelling as an overlapping activity across content areas, not a separate extra block of official questions.

Checked example

Original delivery model $C=8+3d$, d in kilometres, predicts 23 units for 5 km. Bills are consistently 2 units higher at several distances, supporting a revised intercept 10 while keeping slope 3. A wall 4 m by 2.5 m has area 10 m^2 ; subtracting a 2 m^2 doorway gives 8 m^2 to paint. At 6 units/m^2 , cost is 48. A 1:50 plan of a 4 m wall shows 8 cm.

Common error

Do not treat an intercept model as direct proportion or adjust every parameter when evidence identifies one systematic error.

E-purpose · English: purpose, focus and argumentative support

- Enhanced ACT English uses passage-based editing, including argument. Read the surrounding paragraph and its role in the complete passage; a proposed addition may be grammatical yet irrelevant. Name the writer's purpose in a short phrase, such as explain a constraint, defend a choice or acknowledge a limitation. Then compare the sentence's contribution to that purpose.
- For a question asking whether to add or delete material, decide first and choose the reason second. A detail supports a claim when it addresses the actual relationship asserted. Evidence of popularity does not automatically demonstrate accessibility, affordability or reliability. A plausible anecdote can illustrate an idea without proving a universal conclusion.
- An argument can acknowledge a competing view while maintaining its central claim. A useful counterclaim is specific enough to answer; caricaturing an opponent weakens reasoning. Qualification words such as some, during the trial or in this building limit a claim to the evidence. Do not broaden a passage merely to make its conclusion sound confident.
- The original passage below is a targeted editing case, not a complete official English form. Practise the exam's passage context by rereading the whole paragraph after each edit. Judge options against the supplied goal, including an explicit focus in the stem; the most interesting detail is not necessarily the most relevant one.

Checked example

Original passage: "The library should reserve a small quiet room for online interviews. Last month, three applicants had to leave the shared computer area because nearby conversations interrupted their calls. Some readers worry that reserving a room would reduce study space. Booking interviews only during the two least busy afternoon hours would limit that cost." Proposed addition after sentence 2: "The library also owns

a rare nineteenth-century atlas.” Delete it: the atlas does not support the case for interview space. An appropriate addition would report the duration and frequency of interrupted interviews, or evidence that the proposed hours are less busy. The counterclaim about study space is relevant and the final sentence answers it without claiming that all inconvenience disappears.

Common error

Keep the claim’s scope. “Three interrupted calls” supports a local problem; it does not establish that every visitor needs an interview room.

E-cohesion · English: paragraph order, cohesion and introductions

- Create a brief passage outline before a placement decision: problem, response, evidence, limitation or another supported sequence. Paragraph order is not determined by length. A sentence beginning with this approach requires a recoverable approach before it; a reported result generally follows the procedure producing it. Check both the preceding and following sentence at each candidate position.
- Transitions express logic. Additionally adds support, however introduces contrast, consequently signals a result and for example introduces an instance. A transition can be locally fluent but wrong for the actual connection. Remove it mentally, name the relation between the ideas, then choose the expression. Chronological sequence and causal explanation can differ.
- An introduction should establish the passage’s subject and direction without overclaiming or detailing a result the passage never discusses. A conclusion can draw together the passage’s evidence or return to its purpose. It should not introduce an unrelated new problem requiring a separate argument. The task may ask for a specific function, such as linking a paragraph back to the opening.
- For an insertion or reorder item, read the resulting whole paragraph. Pronoun reference, repeated terms and contrast pairs provide constraints, but one cue alone is not enough. Keep the passage’s unity: a sentence’s general topic may match while its function interrupts the argument. These targeted cases prepare the editing process rather than reproduce an official full-form passage.

Checked example

Original paragraph, scrambled: [A] “This arrangement let two groups test the route on the same afternoon.” [B] “Volunteers first divided into a cycling group and a walking group.” [C] “Both groups then recorded where the route signs were hard to see.” [D] “Their notes guided the placement of larger signs the following week.” Order B–A–C–D establishes the arrangement, explains its benefit, reports the observation and follows

with the response. In “The larger signs were easier to notice; however, one remained hidden by a branch,” however introduces a real limitation. A conclusion promising that no visitor will ever get lost would exceed the reported evidence.

Common error

Do not attach “this arrangement” before its antecedent or use a result transition merely because events occurred later.

E-language · English: precision, concision and consistent style

- Use context to decide what a sentence must communicate. Concision removes duplication, not distinctions. In a trial with limited evidence, words such as approximately or during the first week may be essential. Replace a vague noun or verb with a precise choice supported by the passage rather than a more impressive word with a different meaning.
- Common redundancies include repeat again, a total sum and return back. Some repeated words instead create a deliberate rhetorical pattern or distinguish terms. Compare complete meanings, not word counts alone. A concise option that deletes the subject, reverses the relationship or removes a necessary condition is not a good revision.
- Style covers tone and language suited to purpose and audience. An informative report normally uses measured, specific language; a personal narrative may use informal wording consistently. There is no rule that the most formal option always wins. Detect sudden slang, inflated diction or emotional judgement that conflicts with the passage’s established voice.
- Use the stem’s editing goal to decide whether an item concerns precision, economy or style. Read every option in its complete sentence, including unchanged text. Prefer an exact verb such as postponed over a loose phrase when the context supports delay rather than cancellation. Avoid introducing an unsupported opinion through a supposedly stylish adjective.

Checked example

Original report: “During the two-week trial, volunteers recorded the temperature every morning. They repeated the measurements again at noon. The second readings were approximately two degrees higher. This totally awesome discovery proves the room is always hotter after lunch.” Revise to “They repeated the measurements at noon” and “The noon readings were approximately two degrees higher during the trial.” The second revision restores a measured tone and the limited finding. It does not say that

all afternoons or all rooms behave alike. “Postponed” fits a meeting moved to Friday; “cancelled” would change its status.

Common error

Do not delete a qualifier that limits evidence, choose a word for its length, or assume all passages need the same formality.

E-conventions • English: sentence formation, agreement and punctuation

- A complete independent clause has a subject and finite verb and can stand alone. A dependent clause introduced by *although* or *because* needs a main clause. Join independent clauses with a period, a semicolon, or a comma plus an appropriate coordinating conjunction. A comma alone generally creates a comma splice. A semicolon does not repair a fragment.
- Identify the head of the subject rather than the nearest noun. Prepositional phrases and inserted comments may separate it from the verb. Pronouns must refer clearly to the intended antecedent and use the correct form in their grammatical role. Keep verb tense consistent with the actual sequence of events rather than mechanically making every verb identical.
- Use paired commas for a nonessential inserted element and avoid commas separating a subject from its verb. A colon can introduce an explanation or list after a complete clause. Apostrophes mark possession or omitted letters, not ordinary plurals. Punctuation choices must be judged in the entire sentence, including material outside the selected span.
- Modifiers should attach to what they describe. In “Walking into the archive, the map caught Lena’s attention,” the introductory modifier wrongly makes the map the walker. Revise to “Walking into the archive, Lena noticed the map.” Parallel items should use compatible grammatical forms. Identify the structural error before comparing surface wording.

Checked example

Original editing case: “Although the archive was small. Its collection of local maps were extensive, visitors could compare several editions. Examining a faded sheet, a spelling error surprised Lena.” Revision: “Although the archive was small, its collection of local maps was extensive; visitors could compare several editions. Examining a faded sheet, Lena noticed a spelling error.” The first dependent clause now connects to a main clause. Collection is singular, so was agrees. A semicolon joins the two complete clauses. Lena becomes the subject described by examining.

Common error

A pause is not a punctuation rule. Identify clause boundaries, modifier attachment and subject–verb relationships.

R-details · Reading: explicit detail, inference and relationships

- Read an ACT passage for both its overall movement and its details. Build a paragraph map using a few words per paragraph, then return to the relevant lines when answering. A detail item asks what the text states; an inference item requires a conclusion supported by those details. Neither licences filling gaps with outside knowledge or a familiar story.
- Relationship questions may compare characters, explain a cause, establish sequence or connect a local detail to the whole. Distinguish chronology from cause: after does not by itself mean because. Track changes over time and the particular evidence making a contrast meaningful. If the text qualifies a claim, keep that qualification in the answer.
- Compare options for scope and certainty. All, never, only and proves may exceed a passage saying some, often or suggests. A plausible motive is weaker than a motive supported by reported action or speech. Narrative uncertainty can be deliberate; do not resolve it more definitely than the narrator does.
- The original extract is a short targeted case. Complete enhanced Reading practice also needs sustained long passages, paired texts and graphic information under the correct component timing. Use paragraph mapping here without treating this exercise as a full-length 36-item form or a scaled-score predictor.

Checked example

Original extract: “At first, Mina sorted the workshop’s spare parts by size, as the previous keeper had done. She could find a large bolt quickly, but visitors still waited while she searched for the matching washers. After watching a mechanic collect both parts for a repair, she placed commonly paired pieces together. The shelves looked less symmetrical. The waiting line, however, moved faster. Mina kept one drawer in the old arrangement because its rarely used pieces had no regular partners.” Explicit: she retained one drawer in the old arrangement. Supported inference: she valued practical retrieval over a fully symmetrical display. Cause: the observed pairing exposed a weakness in sorting by size alone. Unsupported: she disliked the previous keeper, or the new scheme improved every drawer.

Common error

A character's action may support a priority without proving an unreported emotion or universal benefit.

R-craft · Reading: contextual meaning, structure and point of view

- For vocabulary in context, replace the word with a plain paraphrase and check the whole sentence. Familiar dictionary meanings compete; the passage's situation selects one. Technical or figurative use may differ from everyday usage. A strongly positive or negative connotation also needs contextual support rather than an isolated association.
- Structure questions ask what a part does: introduce a problem, illustrate a claim, complicate an initial judgement or return to an image. Describe the function before picking an answer. A narrative may begin at an ending and then explain how it arose; a comparison may alternate topics rather than treating each in a separate block. Identify the effect of the arrangement, not merely the subject of a paragraph.
- Point of view affects access to knowledge. A first-person narrator reports a particular perspective and may express uncertainty about someone else's motives. A quoted opinion belongs to its speaker; it is not automatically endorsed by the author. Purpose concerns the passage's communicative task, such as explaining a change or questioning an assumption, and should be supported by the whole text.
- Tone emerges from word choice and treatment of evidence. Mild scepticism differs from hostility, and affectionate humour differs from mockery. Use at least two local cues when alternatives differ by degree. Do not infer author biography or certainty from a narrator's tentative observation. Read the beginning and ending together to see whether the perspective shifts.

Checked example

Original extract: "I called the restored clock stubborn when it refused to run. My aunt smiled: 'It has been waiting longer than you have.' She opened the case and pointed to a loose spring. By evening, the steady ticking made my accusation seem theatrical. I still do not know whether her smile was patience or amusement." Stubborn personifies the clock's resistance, not its deliberate intention. The movement from accusation to a simple repair gently qualifies the narrator's first judgement. The final uncertainty limits access to the aunt's motives. The quoted remark adds humour; it does not prove the aunt thought the clock could consciously wait.

Common error

A quotation, narrator and author need not share one attitude. Match the answer to the viewpoint the stem names.

R-integration · Reading: arguments, paired texts and graphic evidence

- Identify each argument's claim, evidence and limits separately before comparing texts. A criticism may concern method, cost or certainty rather than the goal itself. Relevance asks whether evidence bears on the claim; sufficiency asks whether its amount and quality warrant the conclusion. A counterexample can weaken a universal claim without disproving a narrower one.
- For paired texts, make a two-column mental map of shared concerns and distinct positions. An answer can misrepresent both authors by combining one author's evidence with the other's conclusion. When predicting a response, use the responding author's stated principle; do not invent a view simply because the authors disagree elsewhere.
- Read a visual's title, axes, units, groups and notes before using its values. A table may summarise observed counts rather than rates; compare denominators before interpreting a difference. Link the exact visual finding to the claim in the passage. A numerical trend does not establish a causal mechanism unless the design and text supply that support.
- The original paired case uses a compact table represented in words. It is targeted practice, not a full long Reading passage set. In a complete set, return between passage and visual as needed and answer the specified relationship rather than every interesting numerical pattern. Keep survey, pilot and measured outcome claims distinct.

Checked example

Original Text A: "Extend opening hours first. The pilot recorded 18 evening visits across four evenings, so access after work is a real concern. Before buying more equipment, see whether a longer schedule spreads demand." Text B: "Evening access matters, but schedule changes alone will not solve equipment queues. In the same pilot, ten of the eighteen evening visitors waited for a machine. Purchase decisions should use both attendance and waiting data." Pilot table: morning 20 visits/4 waited; afternoon 30/6; evening 18/10. Both authors value access, but B says capacity also matters. Waiting proportions are 20%, 20% and about 56%, so evening has the highest waiting proportion despite the lowest visit count. This supports investigating an evening bottleneck; the observational pilot does not prove buying a machine is the best solution.

Common error

Counts are not rates, shared goals are not identical recommendations, and a four-evening pilot does not establish a universal causal claim.

S-investigation · Science: research summaries, controls and engineering tests

- Research Summaries passages describe experiments with related but distinct designs. Make a compact table of what changed, what was measured and what stayed fixed. Compare experiment numbers carefully: the same material might be used at a different volume, temperature or duration. A control supplies a comparison for a stated effect; it is not necessarily a trial with no treatment in every possible experiment.
- To isolate a variable, hold relevant alternatives constant and vary that variable deliberately. Repeated trials assess variability and reduce reliance on one observation. Random allocation can reduce systematic group differences when the design permits it. A result from one apparatus, duration or population does not automatically generalise to another.
- A follow-up experiment should distinguish the proposed explanations. Predict what each would expect and choose a measurement capable of separating them. Extending a study to a new range tests generality, but changing several conditions simultaneously can prevent a causal interpretation. State whether the new task explores a relationship or isolates an explanation.
- Engineering tasks add a goal, measurable criteria and constraints such as cost, mass or allowable deflection. A design is acceptable only when it satisfies the required constraints. Optimising one measurement does not necessarily make it best overall. A fair comparison applies the same test load and procedure, with repeat trials where feasible.

Checked example

Original engineering study: beams A and B are tested at a 10 N load with identical length and supports. A costs 4 units and deflects 3 mm; B costs 7 and deflects 1 mm. Required cost ≤ 5 and deflection ≤ 4 mm. A satisfies both constraints; B fails cost despite smaller deflection. To test whether thickness explains deflection, use beams of the same material, length and support geometry at several thicknesses under the same load. Testing one thick wooden beam and one thin metal beam confounds material with thickness. Repeated measurements can reveal variation, but repetition alone does not remove that confounding.

Common error

A repeated confounded experiment remains confounded. Best performance on one metric can fail the design brief.

S-models · Science: conflicting viewpoints and evidence that separates models

- Conflicting Viewpoints passages present alternative explanations of the same observation. Label each model's mechanism, assumptions and predicted behaviour before answering. A model may agree about the observation while disagreeing about the cause. Keep track of whether the stem asks what a model predicts or what the observed data actually establish.
- A useful discriminating test places models where their predictions differ. Evidence consistent with both supports neither uniquely. Contradiction can weaken a model on its stated assumptions; it need not prove that a competing model is the only possible explanation. Identify conditions that could invalidate the comparison, including an unstated change in measurement method.
- When extending a model, apply its stated relationship consistently to the new situation. Do not import a familiar scientific law if the passage defines a different hypothetical mechanism. Compare predictions numerically where possible, and mark the assumptions needed for a causal inference. Results can lead to a revised model rather than a simple winning viewpoint.
- Engineering design thinking weighs evidence against a target and considers a modification's trade-offs. Explain why a change might address the observed failure and what new test would verify it. A design recommendation should use the passage's criteria and acknowledge competing effects, rather than assume that the strongest material, highest speed or lowest price is always optimal.

Checked example

Original hypothetical study: a device's indicator dims during repeated use. Model A says dimming depends only on elapsed running time: after 10 minutes it predicts the same brightness at all room temperatures. Model B says dimming is caused by an internal temperature rise: after 10 minutes it predicts lower brightness in a warmer room, provided the starting devices are identical. Test matched devices at 15°C and 30°C for ten minutes, controlling initial charge and measurement method. Equal brightness is consistent with A but does not decisively reject B unless temperature differences and sensitivity are verified. Much lower brightness at 30°C conflicts with A's "time only" assumption and supports B's predicted direction. A cooling modification should also be tested for cost and power consumption before recommending it.

Common error

A directionally supportive result is not unique proof. Check that the competing predictions truly differ under the test conditions.

S-data-representation • Science: data representation and defensible extrapolation

- Data Representation passages use tables, graphs or diagrams as primary evidence. Start with the variable labels and units, and identify which conditions are held constant. A row may report one trial or an average; a legend may distinguish groups measured under different conditions. Locate the requested value before using prior scientific knowledge.
- Translate representations without changing their meaning. A rising quantity can have a falling rate of increase. A steep line is meaningful only relative to axis scales and units. When comparing curves, distinguish an absolute value, a difference and a rate. Use corresponding x-values for a fair comparison unless the stem explicitly asks for another relationship.
- Interpolation estimates inside observed bounds. For a straight segment between two points, use the fraction of the input interval and apply it to the output difference. Extrapolation extends beyond those bounds and depends more strongly on the proposed model. Negative predicted quantities or physical limits supplied by the passage can reveal a model's invalid extension.
- Reevaluation asks whether new evidence supports an earlier trend or requires a different explanation. One discordant measurement could reflect noise or a model limitation; use the stated uncertainty and experimental conditions. The dataset here is original and hypothetical, so the task's given model supplies the relevant relationships. It is not a claim about every real material.

Checked example

Original trial: identical containers hold a test liquid, starting at 20°C in the same room. Recorded times in minutes are 0, 2, 4, 6; measured temperatures in °C are 20, 28, 34, 38. The liquid warms, but consecutive two-minute rises are 8, 6 and 4°C: its average warming rate decreases. Linear interpolation between 2 and 4 minutes gives $T(3)=28+(3-2)/(4-2)\times(34-28)=31^{\circ}\text{C}$. Extending the first interval's 4°C/min rate to 6 minutes predicts 44°C, inconsistent with the measured 38°C. New evidence therefore rejects a constant-rate model across all six minutes.

Common error

A monotonic rise in temperature is not a constant rise per minute. Do not extrapolate an early slope as if later measurements did not exist.