AP Precalculus

Common Mistakes · 常见错误

This exam scores the sentence as much as the number: a rate of change described in words, a concavity justified, a model's parameters reported to three decimals. Everything below is a rule the readers apply. 本科不仅看结果，也看表述：变化率要说清楚，凹凸性要有理由，参数保留三位小数。

Presentation – the rules that apply to every question

✗ Reporting a parameter to two decimal places.

✓ **Three places after the decimal point, by rounding or truncating.**

Stated in the general scoring notes of every question; an under-rounded value loses the point on its own.

小数保留三位 SG 2 years

✗ Worrying that 2.000 should be written differently.

✓ **Trailing zeros need not be reported: 2.000, 2.00, 2.0 and 2 are all accepted.**

The guidelines say so explicitly – a decimal presentation error is only a fault when the value itself is wrong.

末位零可以省略 SG 2 years

✗ Writing a fraction whose bar could span either the numerator or more.

✓ **Size the bar to exactly what it covers, and bracket substituted expressions.**

The guidelines require parentheses to be used correctly and fraction bars to be clearly and correctly proportioned.

括号和分数线要清楚 SG 2 years

✗ Giving an angle in degrees.

✓ **Angle measures are assumed to be in radians unless the question says otherwise.**

Stated in the general scoring notes, along with the requirement that solutions be real numbers.

角度默认用弧度 SG 2 years

✗ Answering part (ii) with a value that contradicts part (i).

✓ **Use your own earlier value consistently, including the endpoint your working used.**

The guidelines award the second point only when the estimate is consistent with both the reported value and the endpoint used.

后一问要与前一问一致 SG 2 years

■ Where a part says no supporting work is required, the answer alone earns the point – do not spend time justifying it.

注明不需过程的题只写答案 SG2024

1 · Polynomial and Rational Functions 多项式函数与有理函数

✗ Saying a function is increasing when the question asked about its RATE of change.

✓ **Distinguish them: the function rises while its rate of change may be falling.**

The guidelines award the point for 'positive and increasing' or its equivalent – the two properties are scored together.

函数递增 ≠ 变化率递增 SG2024

✗ Answering a concavity question with 'the graph is concave down' alone.

✓ **Connect it to the rate of change: concave down means the rate of change is decreasing.**

The guidelines state the point is not earned for the concavity statement by itself.

凹凸性要联系变化率 SG2024

✗ Describing end behaviour in words that could mean either direction.

✓ **Write the limit:** $\lim_{x\to\infty} g(x) = -\infty$**.**

The guidelines list the accepted limit notations, all of which state the direction unambiguously.

用极限记号写终末行为 SG 2 years

✗ Finding a vertical asymptote without checking the numerator.

✓ **A shared factor gives a HOLE, not an asymptote.**

This distinction decides the shape of the whole graph and is a standard discriminator in the unit.

共同因式是空洞不是渐近线 CED 1.7

✗ Assuming a polynomial changes sign at every zero.

✓ **An even multiplicity touches the axis and turns back; an odd one crosses.**

Sign analysis built on the wrong assumption gives the wrong intervals throughout.

偶重根不变号 CED 1.5

✗ Comparing two functions' growth by their values at one point.

✓ **Compare their rates of change, or their behaviour as** x **grows.**

A single point never distinguishes a polynomial from an exponential, which is the comparison this unit tests.

比较增长要看变化率 CED 1.13

✗ Answering a left-endpoint question by describing the interior of the domain.

✓ **Say what happens AT the endpoint the question names.**

The guidelines state a response focusing on the left endpoint is eligible for the point – the endpoint is the answer.

端点问题就写端点 SG2024

2 · Exponential and Logarithmic Functions 指数函数与对数函数

✗ Justifying an exponential model by saying the values 'grow fast'.

✓ **Show the ratio is constant: $f(n+1) = 0.5f(n)$, so successive outputs fall by a factor of 0.5.**

The guidelines require the reasoning to demonstrate that the RATIO applies, and print this as the accepted form.

指数模型要证明比值恒定 SG2024

✗ Fitting a logarithmic model and reporting only the final function.

✓ **Show both equations you solved for a and b, then the model.**

The guidelines award a point for the two equations, separately from the values they produce.

要写出联立的两个方程 SG2024

✗ Solving an exponential equation by dividing instead of taking logarithms.

✓ **Take the log of both sides, then use the power rule to bring the exponent down.**

The structural step is what the unit tests, and the arithmetic route usually cannot be completed.

指数方程要取对数 CED 2.11

✗ Treating $\ln(a+b)$ as $\ln a + \ln b$.

✓ **The log of a PRODUCT splits; the log of a sum does not.**

This is the most persistent algebraic error in the unit and it invalidates everything after it.

对数只能拆乘积 CED 2.10

✗ Reporting a model's prediction beyond the data it was built from with no caveat.

✓ **Say the prediction is an extrapolation and may not hold.**

The reasoning must connect the model's behaviour to the context, which is what the guidelines award the point for.

外推要说明局限 SG2024

3 · Trigonometric and Polar Functions 三角函数与极坐标函数

✗ Solving $\sin x = k$ and giving one solution.

✓ **Give every solution in the interval, and add the period if the question asks generally.**

The guidelines require the supporting work to show the general form before the specific values.

三角方程有多个解 SG2024

✗ Reading amplitude and midline from the equation without checking the vertical shift.

✓ **The midline is the constant added; the amplitude is the coefficient's magnitude.**

The two are read from different parts of the expression, and swapping them changes every value.

中线是常数项, 振幅是系数 CED 3.5

✗ Converting to polar form and losing the quadrant.

✓ **Check the signs of x and y before choosing θ.**

The calculator's inverse tangent returns one branch, which is the wrong quadrant half the time.

极坐标要判断象限 CED 3.13

4 · Functions Involving Parameters, Vectors, and Matrices 涉及参数、向量与矩阵的函数

✗ Composing functions in the wrong order.

✓ **$f(g(x))$ means apply g first.**

The order is the whole content of the question, and the reverse composition is usually also a valid function, so nothing looks wrong.

复合函数先算里面的 CED 4.5

✗ Finding an inverse and not restricting the domain.

✓ **State the domain on which the original function is one-to-one.**

Without the restriction the inverse is not a function, which is what the unit is about.

反函数要限定定义域 CED 4.4

✗ Multiplying matrices in either order.

✓ **Matrix multiplication is not commutative – AB and BA are usually different.**

The order encodes which transformation is applied first, so reversing it changes the answer.

矩阵乘法不可交换 CED 4.12

✗ Giving a vector's magnitude where the question asked for its components.

✓ **Read which is wanted: a magnitude is one number, components are an ordered pair.**

Both are computed from the same working, so the wrong one is easy to write and earns nothing.

分清模长与分量 CED 4.9

✗ Describing a parametric path without saying which way it is traced.

✓ **State the direction as t increases.**

The orientation is part of what a parametric description carries, and it is scored separately from the curve.

参数曲线要说明方向 CED 4.7

✗ Giving a residual's sign without saying what it means.

✓ **A positive residual means the model UNDERestimates the actual value at that point.**

The interpretation is the scored part; the sign alone is arithmetic.

残差为正说明模型低估 CED 2.6

✗ Describing a transformation as 'moved right' without the amount.

✓ **Give the direction and the amount, and note that $f(x-h)$ shifts RIGHT by h.**

The inside-the-bracket sign reverses the direction, which is the standard trap in this unit.

f(x−h) 是右移 h CED 2.14

■ Where the question gives a graph, using it is optional. The guidelines state that use of the graph is not required, so an algebraic route is equally acceptable.

可以不用图, 用代数也行 SG2024

✗ Answering a ‘describe’ question with a formula.

✓ **Describe it in words: what the quantity does, over what interval, and how fast.**

The rubric awards descriptions for their content, and a formula does not state a behaviour.

“ 描述 ” 要用文字 CED 1.3