INKMATHS FLASHCARDS

Further Pure 1 results and forms

12 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in precise wording, the standard results the formulae booklet does not print, a check-yourself question per topic, and the slips that lose marks. The same cards run on the website with spaced-repetition scheduling, at inkphysics.co.uk/maths/flashcards.

STANDARD RESULT

t-formula:

$t = \tan(\theta)/(2)$: $\sin\theta = ?$

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

t-formula:

$t = \tan(\theta)/(2)$: $\cos\theta = ?$

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

Weierstrass substitution:

$t = \tan(x)/(2)$: $dx = ?$

FURTHER PURE 1: RESULTS AND FORMS

RECALL

State how to build a series solution to a differential equation.

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

Parabola:

$y^2 = 4ax$: parametric point? tangent there?

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

Ellipse against hyperbola: which way round?:

ellipse $b^2 = ?$, hyperbola $b^2 = ?$

FURTHER PURE 1: RESULTS AND FORMS

RECALL

State how to get the tangent to a conic at a parametric point.

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

Vector product:

$|a \times b| = ?$

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

$\cos\theta = (1 - t^2)/(1 + t^2)$

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

$\sin\theta = (2t)/(1 + t^2)$

FURTHER PURE 1: RESULTS AND FORMS

RECALL

The booklet prints the Taylor form, so the marks are in getting the numbers into it. Differentiate the equation repeatedly, substitute the given values at $x = a$ each time to turn every derivative into a number, then feed those numbers into the series. Products need the product rule at every stage, which is where the working usually dies.

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

$dx = (2\,dt)/(1 + t^2)$

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

$a^2(1 - e^2)$ where e is below 1, $a^2(e^2 - 1)$ where e is above 1

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

$(at^2, 2at)$, tangent $ty = x + at^2$

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

$|a||b| \sin\theta$, the parallelogram's area

FURTHER PURE 1: RESULTS AND FORMS

RECALL

Differentiate both parametric coordinates with respect to the parameter and divide, so dy/dx is (dy/dt) over (dx/dt). Then use $y - y_1 = m(x - x_1)$ at the point. Implicit differentiation of the cartesian form gives the same gradient when the parameter is ugly.

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

Scalar triple product:

parallelepiped volume = ?, tetrahedron = ?

FURTHER PURE 1: RESULTS AND FORMS

RECALL

State the condition Simpson's rule needs.

FURTHER PURE 1: RESULTS AND FORMS

DEFINITION

Define: L'Hospital's rule.

FURTHER PURE 1: RESULTS AND FORMS

SPOT THE ERROR

Say what is wrong with this claim:

To solve $x/(x - 2) < 3$, multiply both sides by $x - 2$ and solve the result.

FURTHER PURE 1: RESULTS AND FORMS

RECALL

The booklet prints the formula and stops there. The number of strips has to be even, so the ordinates come out odd in number and the coefficients run 1, 4, 2, 4, ..., 4, 1, starting and finishing on a 1. An odd strip count and the rule simply does not apply.

FURTHER PURE 1: RESULTS AND FORMS

STANDARD RESULT

$|\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})|$, $\frac{1}{6}|\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})|$

FURTHER PURE 1: RESULTS AND FORMS

SPOT THE ERROR

$x - 2$ is negative when $x < 2$, and multiplying by a negative reverses the inequality. Subtract to one side, combine over a common denominator, and read a sign diagram; the shortcut loses the whole interval $x < 2$.

FURTHER PURE 1: RESULTS AND FORMS

DEFINITION

For an indeterminate form $0/0$ or ∞/∞, the limit of f/g equals the limit of f'/g', provided that second limit exists.

FURTHER PURE 1: RESULTS AND FORMS