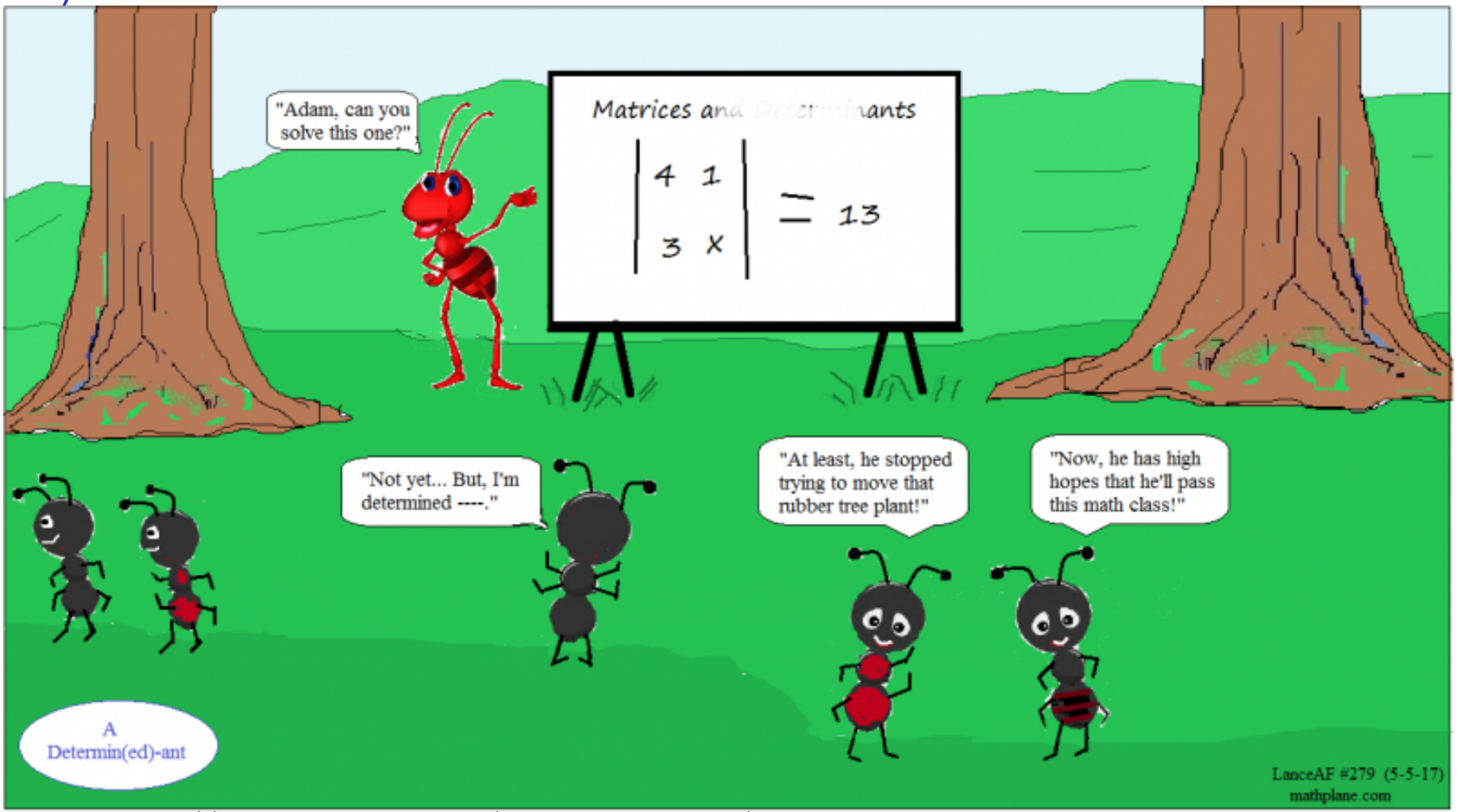
1. Which of the following could relate to determinants?
   a) invertibility of a 2×2 matrix
   b) determinant 1 (or -1) coding matrix with integer entries will ensure we don't pick up fractions in the decoding matrix
   c) both of the above



http://www.mathplane.com/gate_dwebcomics/math_comics_archive_spring_2017

2. Which of the following matrices does not have an inverse?

a) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

b) $\begin{bmatrix} 2 & 2 \\ 4 & 4 \end{bmatrix}$

c) $\begin{bmatrix} 0 & 4 \\ 2 & 0 \end{bmatrix}$

d) more than one do not have inverses

e) all have inverses

Cayley's [1855] introductory paper in matrix theory introduces... the ideas of inverse matrix and of matrix multiplication, or "compounding" as Cayley called it [Richard Feldmann]

3. Which of the following are true about the matrix $A = \begin{bmatrix} 1 & 0 \\ k & 1 \end{bmatrix}$

a) determinant of A is 1

b) A is a vertical shear matrix

c) When we multiply $AB_{2\times n}$ then we have applied $r_2' = kr_1 + r_2$ to B, because A is the elementary matrix representing that row operation

d) more than one of the above

e) all of the above

Resolution of two-way data from hyphenated chromatography by means of **elementary matrix** transformations

R Manne, BV Grande - Chemometrics and Intelligent Laboratory Systems, 2000 - Elsevier

Data from mixtures studied by hyphenated chromatography, eg, HPLC-DAD and similar techniques, are resolved into spectra and concentration profiles by an iterative technique using **elementary matrix** transformations. Applications are made to one artificial data set and …

Google Scholar search of elementary matrix

4. By hand, use Laplace expansion as directed

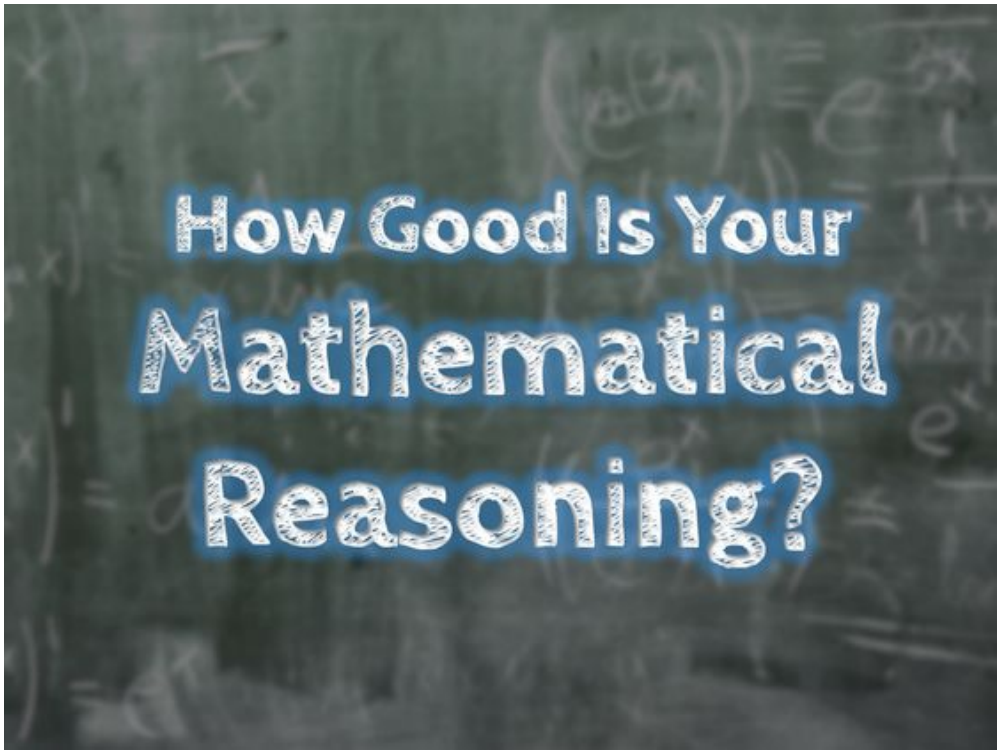
$$\begin{bmatrix} 5 & 2 & 0 & 0 & -2 \\ 0 & 1 & 4 & 3 & 2 \\ 0 & 0 & 2 & 6 & 3 \\ 0 & 0 & 3 & 4 & 1 \\ 0 & 0 & 0 & 0 & 2 \end{bmatrix}$$

Step 1: First expand down the first **column** to take advantage of the 0s. You'll have one nonzero term.
Step 2: then down the 1st **column** of the resulting 4×4 matrix
Step 3: then along the 3rd **row** of the 3×3 matrix. The determinant is

a) 100
b) 0
c) -100
d) -10
e) none of the above

5. Which of the following statements is true?

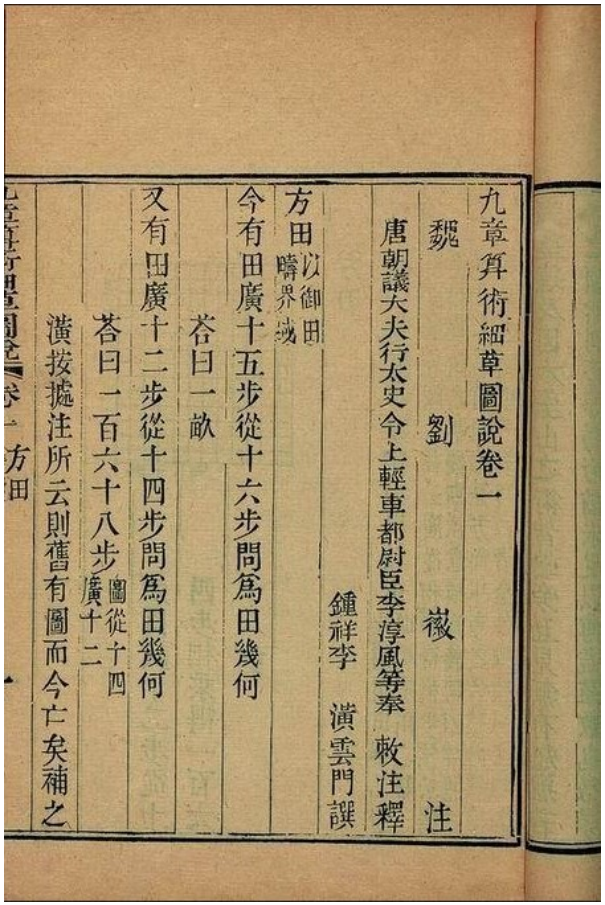
a) If a square matrix has two identical rows then its determinant is zero.
b) If the determinant of a matrix is zero, then the matrix has two identical rows.
c) both
d) none of the above



http://quiztoday.org/good-mathematical-reasoning/

6. Suppose the determinant of matrix A is zero. How many solutions does the system $A\vec{x} = 0$ have?

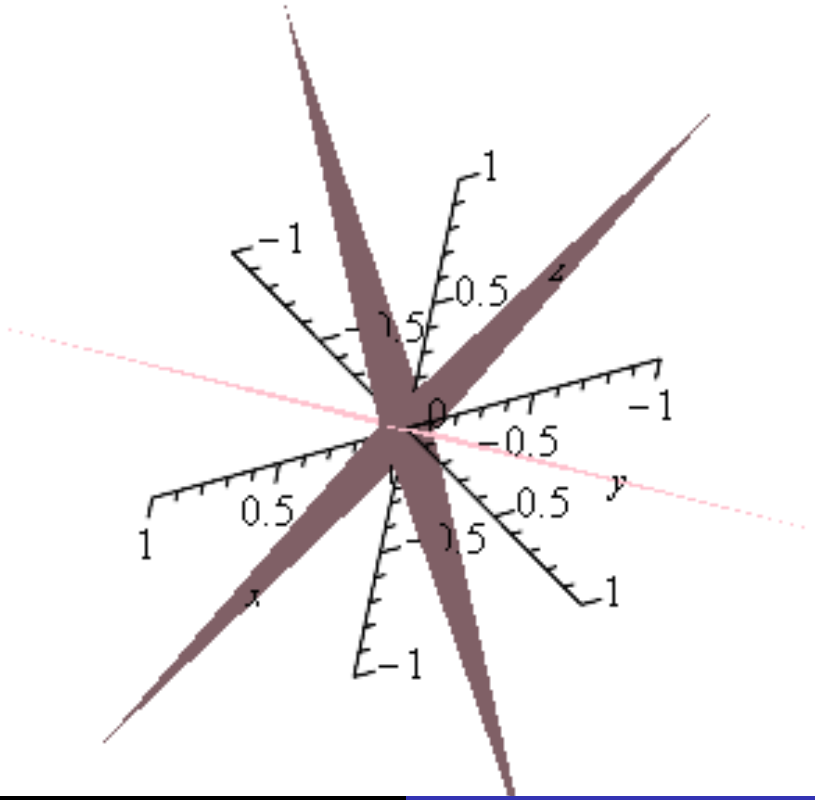
a) 0
b) 1
c) 2
d) infinite
e) other


九章算術細草圖說卷一
魏 劉 徽 注
唐朝議大夫行太史令上輕車都尉臣李淳風等奉 敕注釋
鍾祥李 潢雲門譔
方田 以御田疇界域
今有田廣十五步從十六步問爲田幾何
荅曰一畝
又有田廣十二步從十四步問爲田幾何
荅曰一百六十八步 圖從十四廣十二
潢按攷注所云則舊有圖而今亡矣補之
方田

The Nine Chapters on the Mathematical Art

7. We find that for a square coefficient matrix A, the homogeneous matrix equation $A\vec{x} = \vec{0}$, has only the trivial solution $\vec{x} = \vec{0}$. This means that

a) A has a 0 determinant
b) A has a nonzero determinant
c) This tells us nothing about the determinant



8. Suppose the determinant of matrix A is zero. How many solutions does the system $A\vec{x} = \vec{b}$ have?

a) 0

b) 1

c) infinite

d) 0, 1, or infinite—it depends on what $\vec{b}$ is.

e) 0 or infinite—it depends on what $\vec{b}$ is.

A short survey of some recent applications of determinants
PR Vein - Linear Algebra and its **Applications**, 1982 - Elsevier
Determinants declined in prestige from the mid-nineteenth century onwards and are now best known for their **applications** in matrix theory, where they appear in a subsidiary role. However, during the last thirty years **determinants** have arisen independently of matrices in …
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[BOOK] Determinants and their applications in mathematical physics
R Vein, P Dale - 2006 - books.google.com
The last treatise on the theory of **determinants**, by T. Muir, revised and enlarged by WH Metzler, was published by Dover Publications Inc. in 1960. It is an unabridged and corrected republication of the edition ori-nally published by Longman, Green and Co. in 1933 and …
☆ 99 Cited by 198 Related articles All 16 versions »

Google Scholar search of applications of determinants

9. If A is an invertible matrix, what else must be true?

a) If $AB = C$ then $B = A^{-1}C$

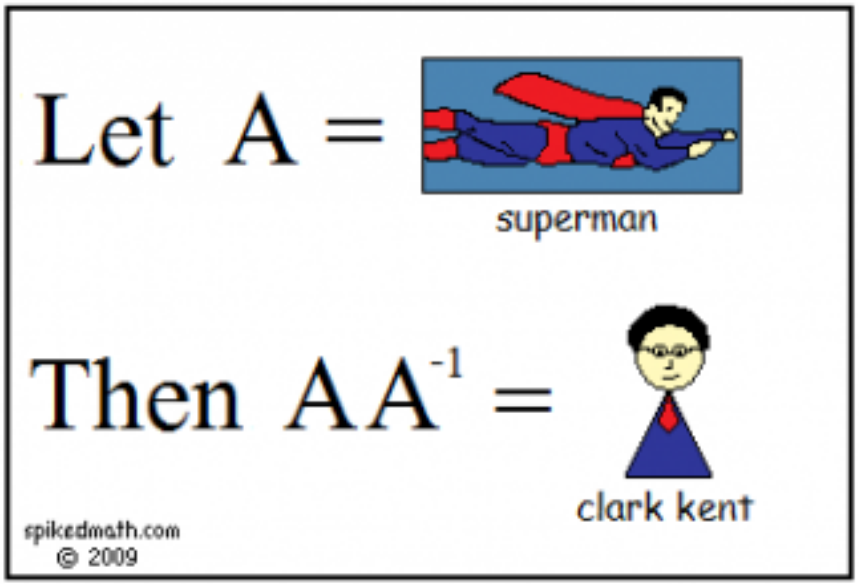
b) the columns of A span the entire space

c) $5A$ is invertible

d) the reduced row echelon form of A is I

e) all of the above must be true

Use linear algebra to find the identity of superman.



http://spikedmath.com/042.html

10. In exercise 3.3 #19, the area of the parallelogram is 8, because that is the determinant of $A = \begin{bmatrix} 5 & 6 \\ 2 & 4 \end{bmatrix}$. Can we find a rectangle that creates a matrix that is row equivalent to A with the same area?

a) impossible with the conditions given
b) it is possible but I am stuck on how to do so
c) yes and I can explain how

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a) impossible with the conditions given

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