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(Greetings from [The On-Line Encyclopedia of Integer Sequences](#)!)

A194687   Least k such that the rank of the elliptic curve $y^2 = x^3 - k^2 \cdot x$ 7
             is n, or -1 if no such k exists.

1, 5, 34, 1254, 29274, 48272239, 6611719866

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OFFSET   0,2

COMMENTS   Fermat found a(0), Biling found a(1), and Wiman found
            a(2)-a(4). Rogers found upper bounds on a(5) and a(6)
            equal to their true value; Rathbun and an unknown
            author verified them as a(5) and a(6), respectively.
            a(7) <= 797507543735, see Rogers 2004.

REFERENCES G. Billing, "Beiträge zur arithmetischen theorie der
            ebenen kubischen kurven geschlechteeins", Nova Acta
            Reg. Soc. Sc. Upsaliensis (4) 11 (1938), Nr. 1. Diss.
            165 S.
            N. Rogers, "Elliptic curves x^3 + y^2 = k with high
            rank", PhD Thesis in Mathematics, Harvard University
            (2004).
            A. Wiman, "Über rationale Punkte auf Kurven y^2 = x(x^2-
            c^2)", Acta Math. 77 (1945), pp. 281-320.

LINKS   [Table of n, a(n) for n=0..6.](#)
            Andrej Dujella, Ali S. Janfada, and Sajad Salami, [A
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            09.5.8.
            Randall L. Rathbun, [Posting to NMBRTHRY](#), Aug 25 2011
            N. F. Rogers, [Rank computations for the congruent number
            elliptic curves](#), Exper. Math. 9:4 (2000), pp. 591-594.
            K. Rubin and A. Silverberg, [Ranks of elliptic curves](#),
            p.464, Table 2.
            Mark Watkins, [On elliptic curves and random matrix
            theory](#), Journal de Theorie des Nombres de Bordeaux
            Author?, [LfunctionsAndModularFormsII / CentralValues /
            Rank4](#)

PROG   (PARI) r(n)=ellanalyticrank(ellinit([0, 0, 0, -n^2, 0]))
            [1]
            rec=0; for(n=1, 1e4, t=r(n); if(t>rec, rec=t;
            print("r("n") = "t)))

CROSSREFS   Cf. [A062693](#), [A062695](#), [A003273](#), [A309028](#), [A309029](#),
            [A319510](#).

Sequence in context: [A295545](#) [A309534](#) [A348375](#) * [A208098](#) [A216759](#) [A144995](#)

Adjacent sequences: [A194684](#) [A194685](#) [A194686](#) * [A194688](#) [A194689](#) [A194690](#)

KEYWORD   nonn,hard,more

AUTHOR   [Charles R Greathouse IV](#), Sep 01 2011

EXTENSIONS Escape clause added to definition by [N. J. A. Sloane](#), Jul 01 2024

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