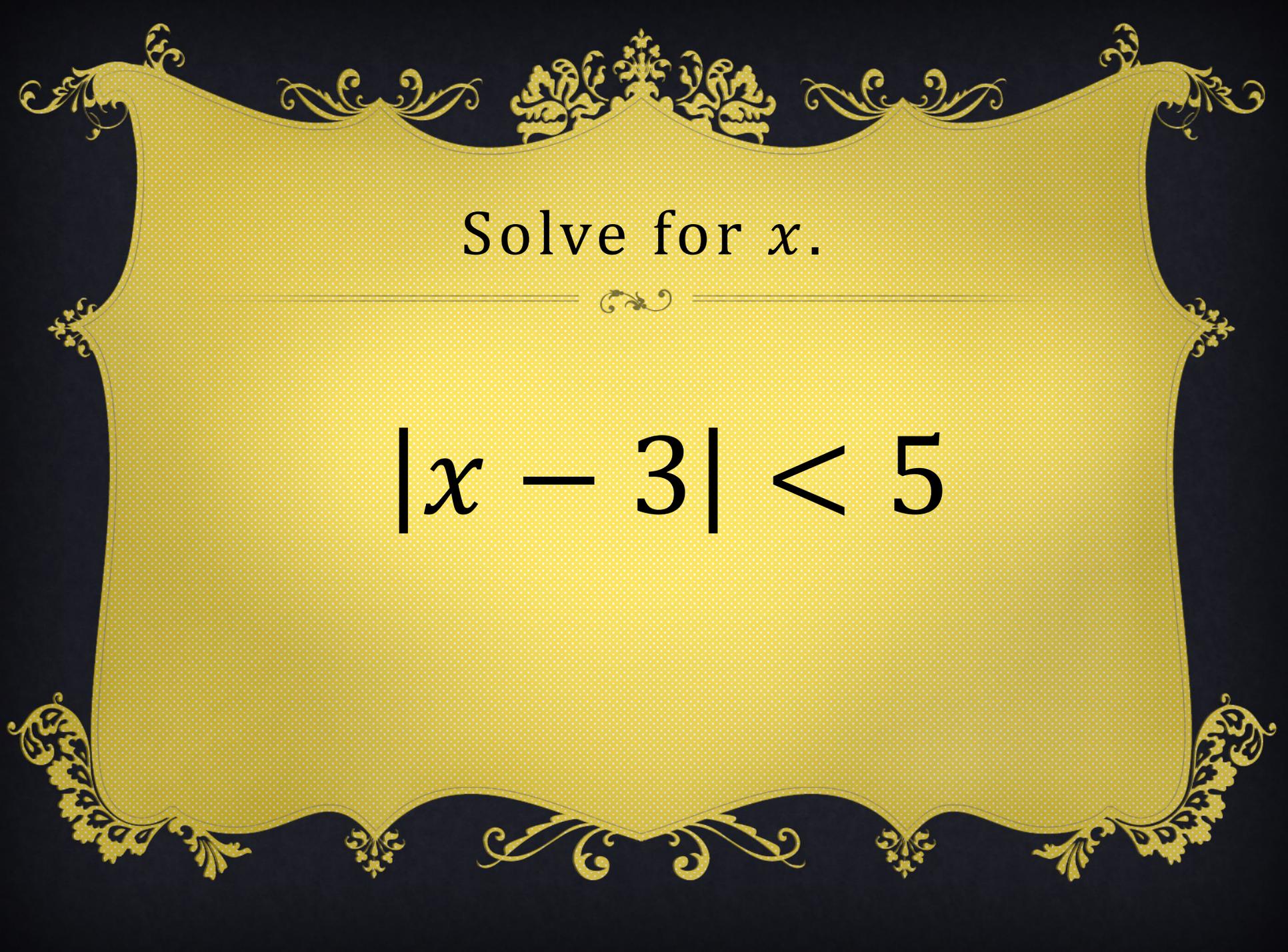




# QUIZ BOWL

XAVIER UNIVERSITY

2024 MATHEMATICS COMPETITION



Solve for  $x$ .

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$$|x - 3| < 5$$

Solve for  $x$ .

$$|x - 3| < 5$$

$$-2 < x < 8$$

Simplify. Give your answer in scientific notation

$$\frac{8 \times 10^7}{(4 \times 10^4)^{\frac{1}{2}}}$$

Simplify. Give your answer in  
scientific notation

$$4 \times 10^5$$

Find the vertex.

$$y = x^2 - 2x + 8$$

Find the vertex.

$$y = x^2 - 2x + 8$$

(1,7)

Find the vertical asymptotes.

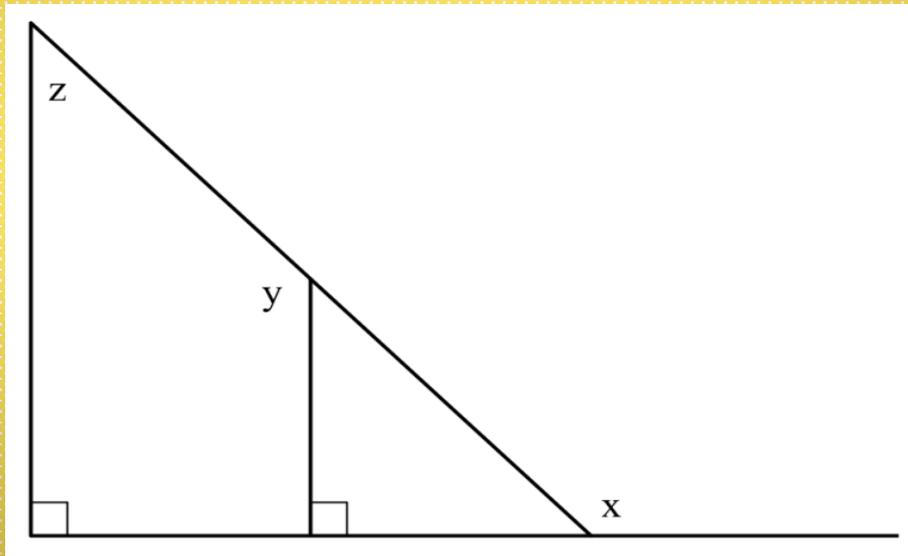
$$f(x) = \frac{x - 4}{x^2 - 16}$$

Find the vertical asymptotes.

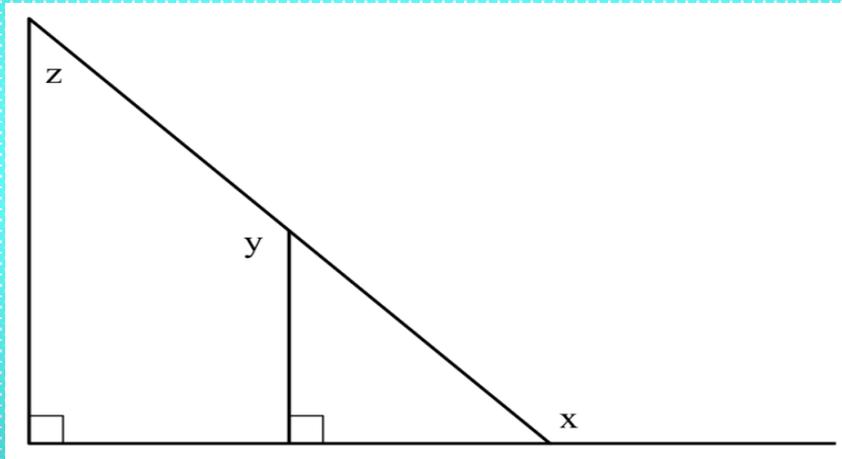
$$f(x) = \frac{x - 4}{x^2 - 16}$$

$$x = -4$$

If  $z = 50^\circ$ , what is  $x + y$ ?

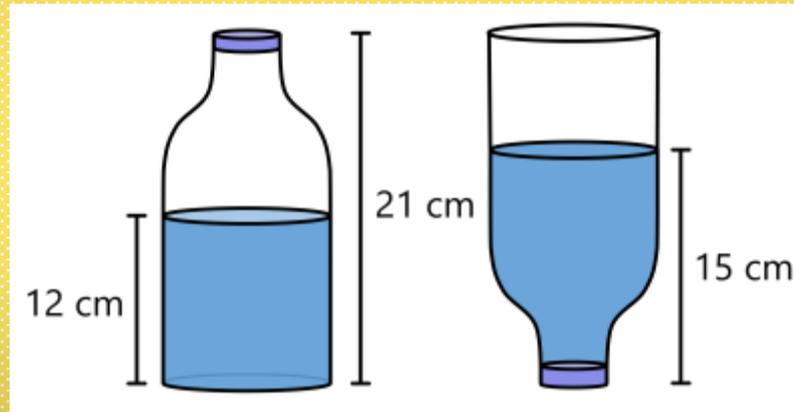


If  $z = 50^\circ$ , what is  $x + y$ ?

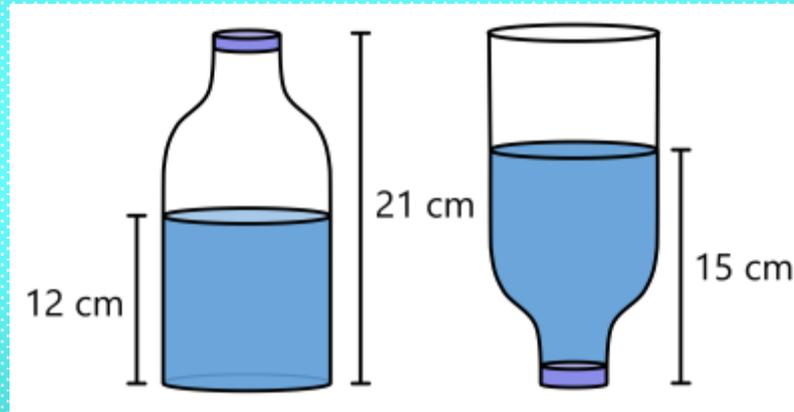


$270^\circ$

What fraction of the bottle is filled with water?



What fraction of the bottle is filled with water?



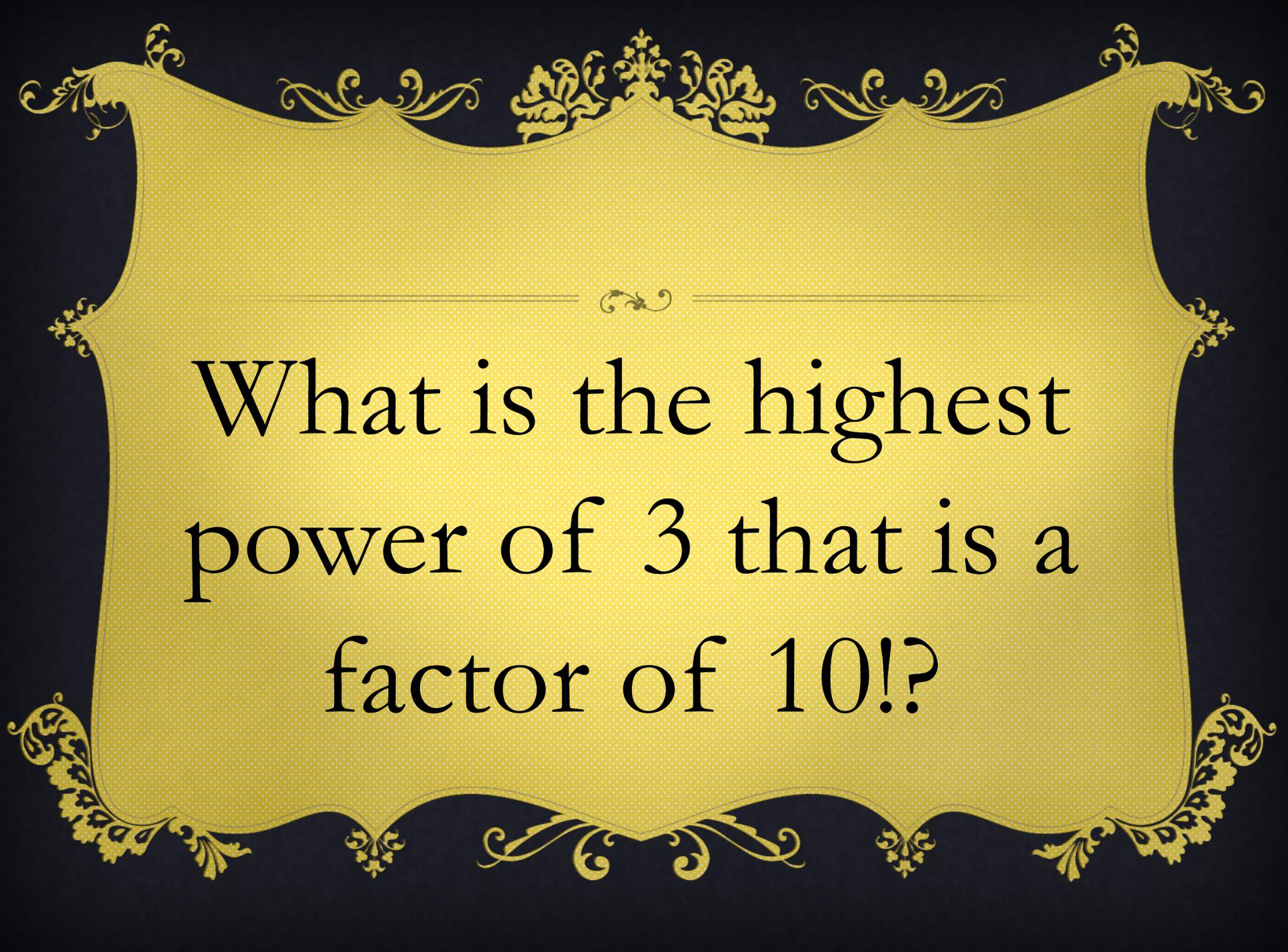
$\frac{2}{3}$



What is the next Roman  
numeral after  
MCMXLIX?



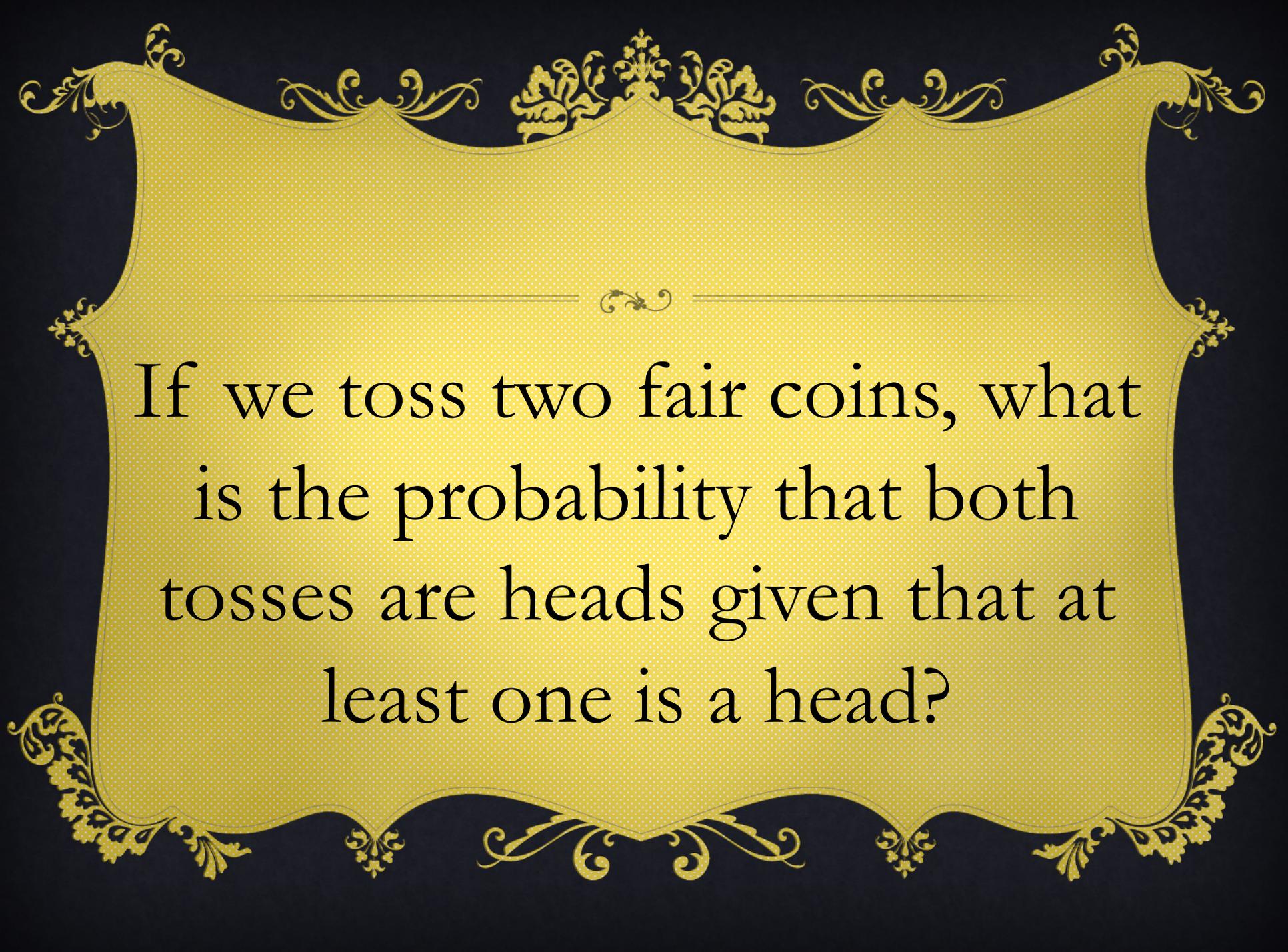
MCML



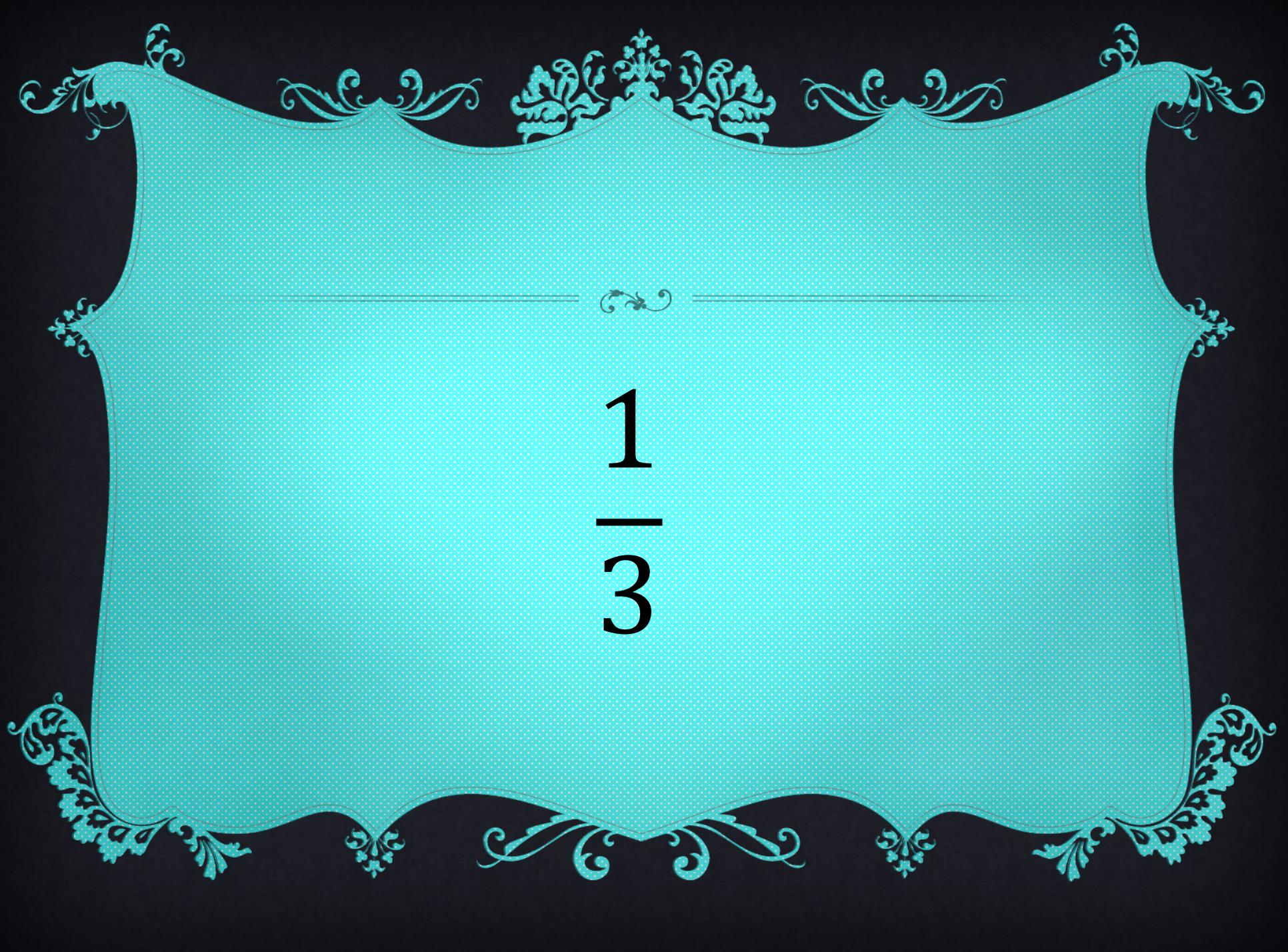
What is the highest  
power of 3 that is a  
factor of  $10!$ ?



4



If we toss two fair coins, what is the probability that both tosses are heads given that at least one is a head?



1  
—  
3

Which is irrational?

$$\pi^0$$

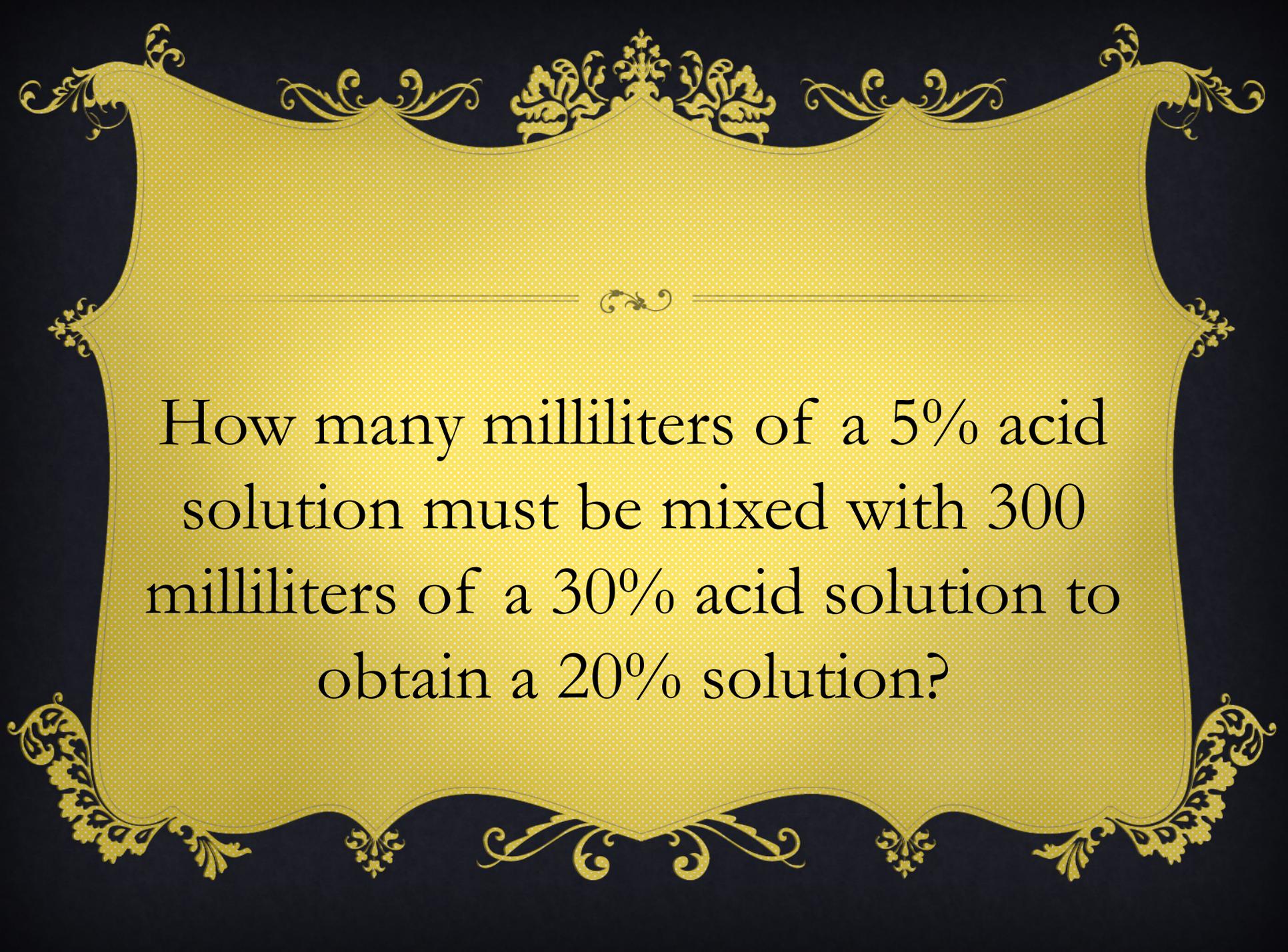
$$\ln(e^9)$$

$$\sqrt{72}$$

$$\sec \frac{\pi}{3}$$

Which is irrational?

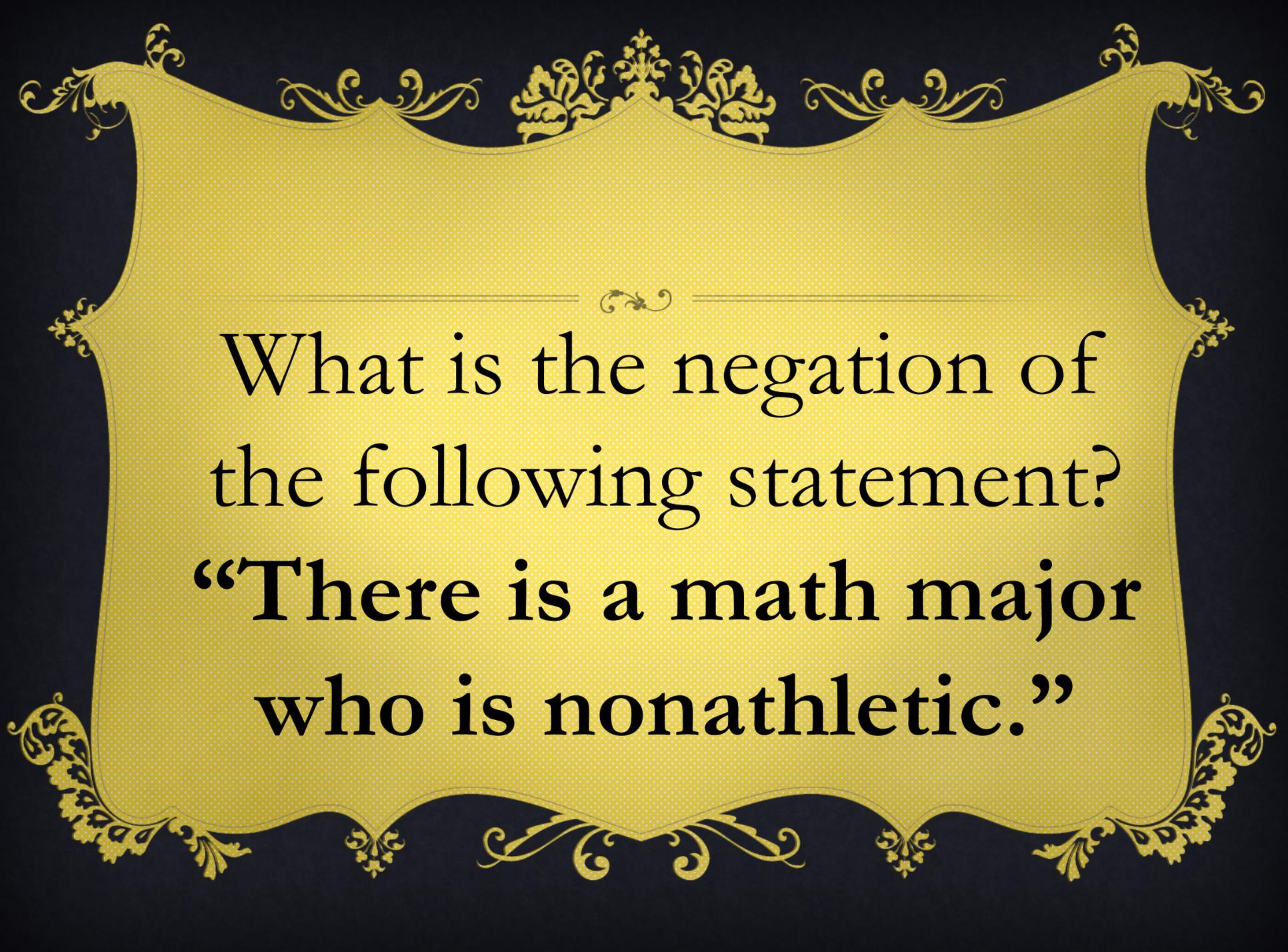
$$\sqrt{72}$$



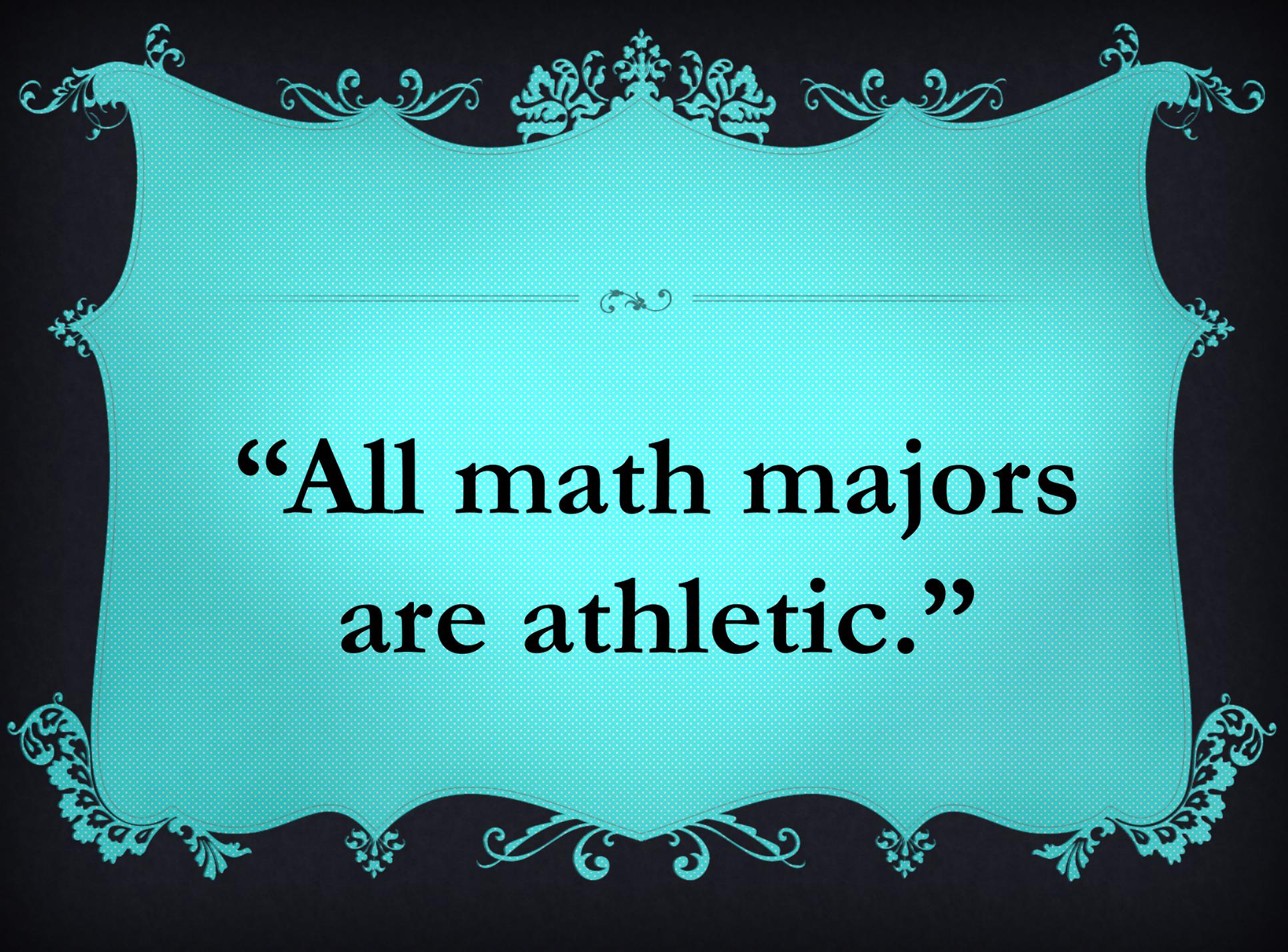
How many milliliters of a 5% acid solution must be mixed with 300 milliliters of a 30% acid solution to obtain a 20% solution?



200 milliliters



What is the negation of  
the following statement?  
**“There is a math major  
who is nonathletic.”**



**“All math majors  
are athletic.”**

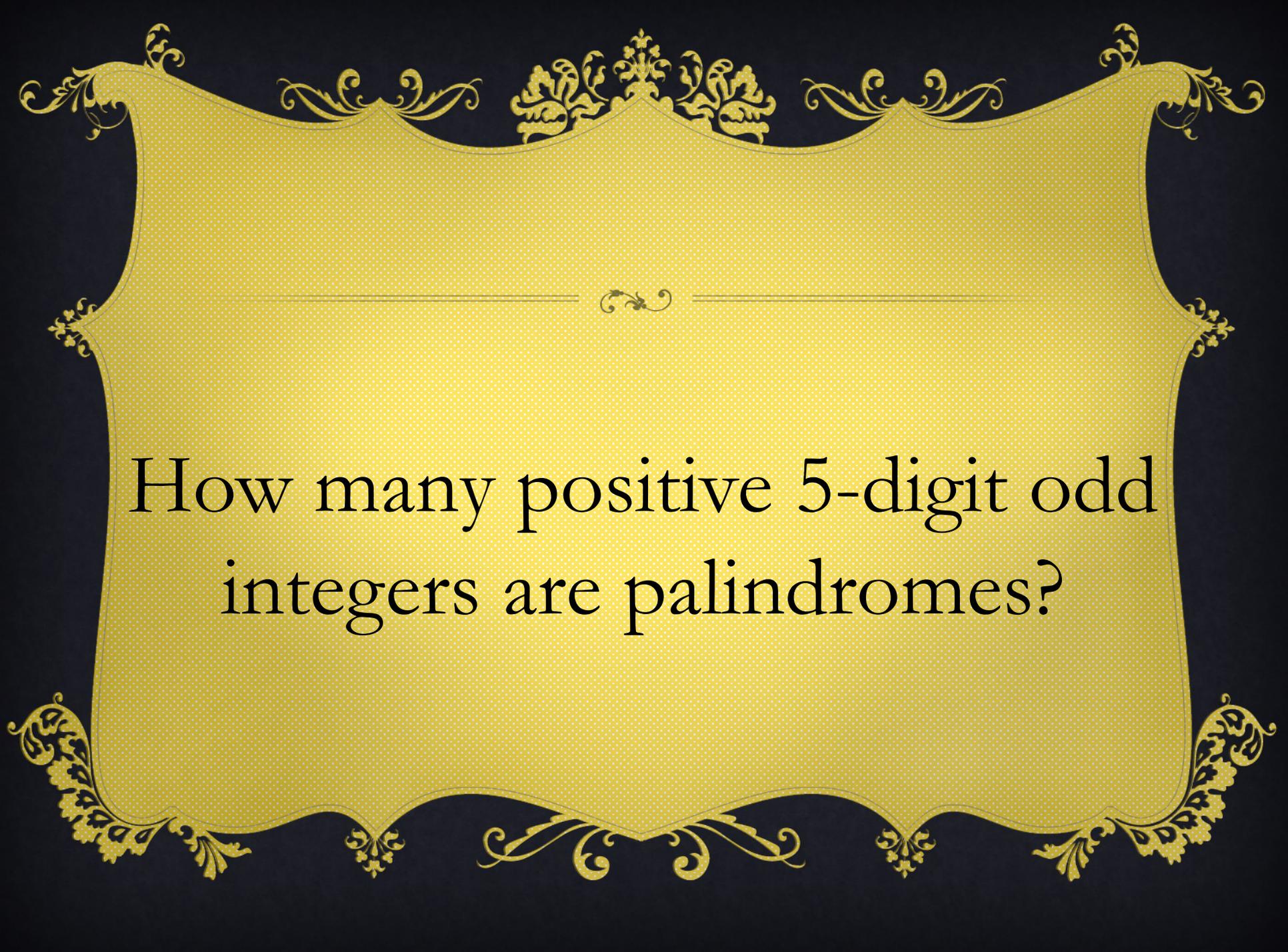
Solve for  $x$ .

$$\log_x(32) = 5$$

Solve for  $x$ .

$$\log_x(32) = 5$$

$$x = 2$$

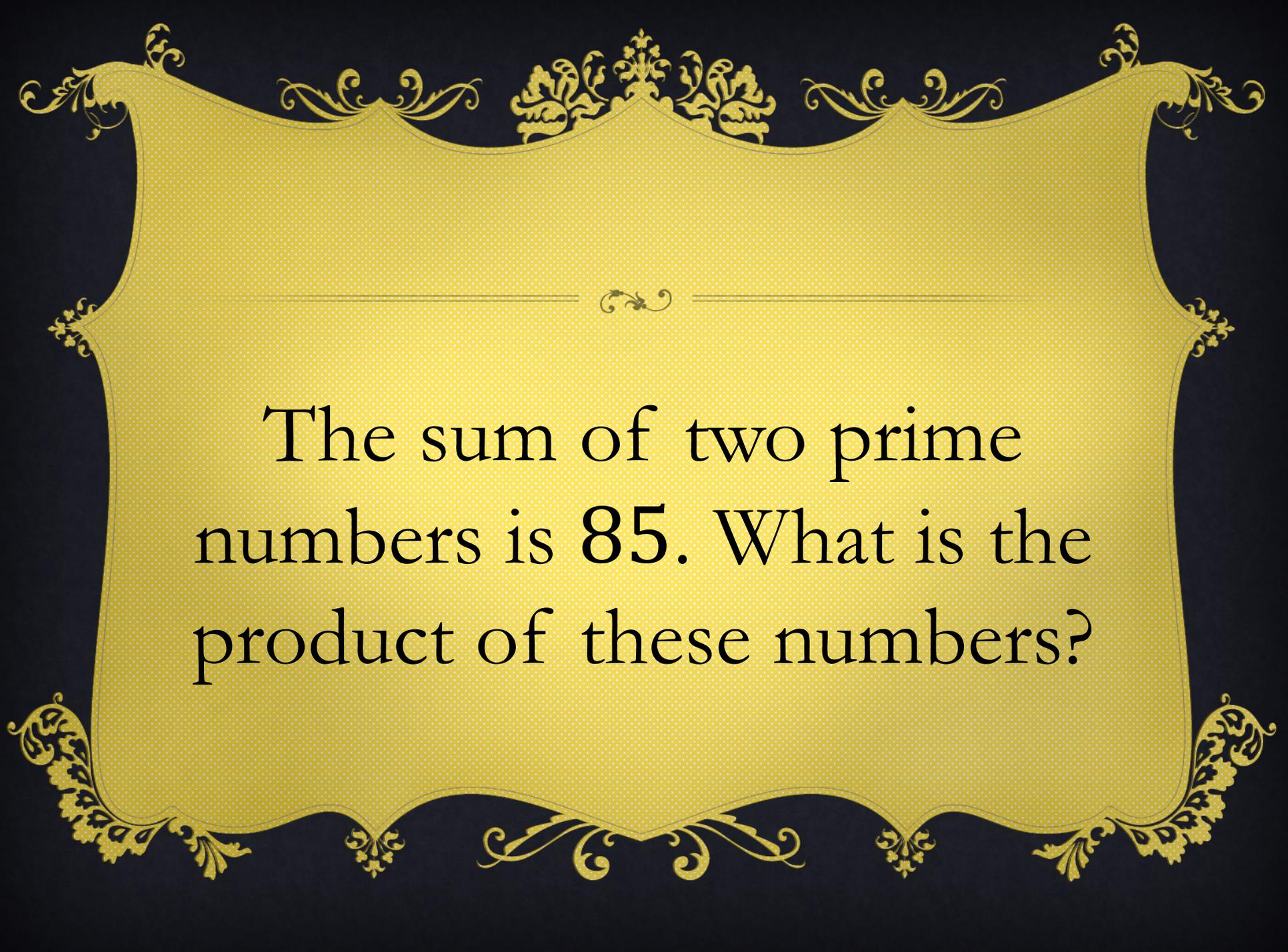


How many positive 5-digit odd integers are palindromes?

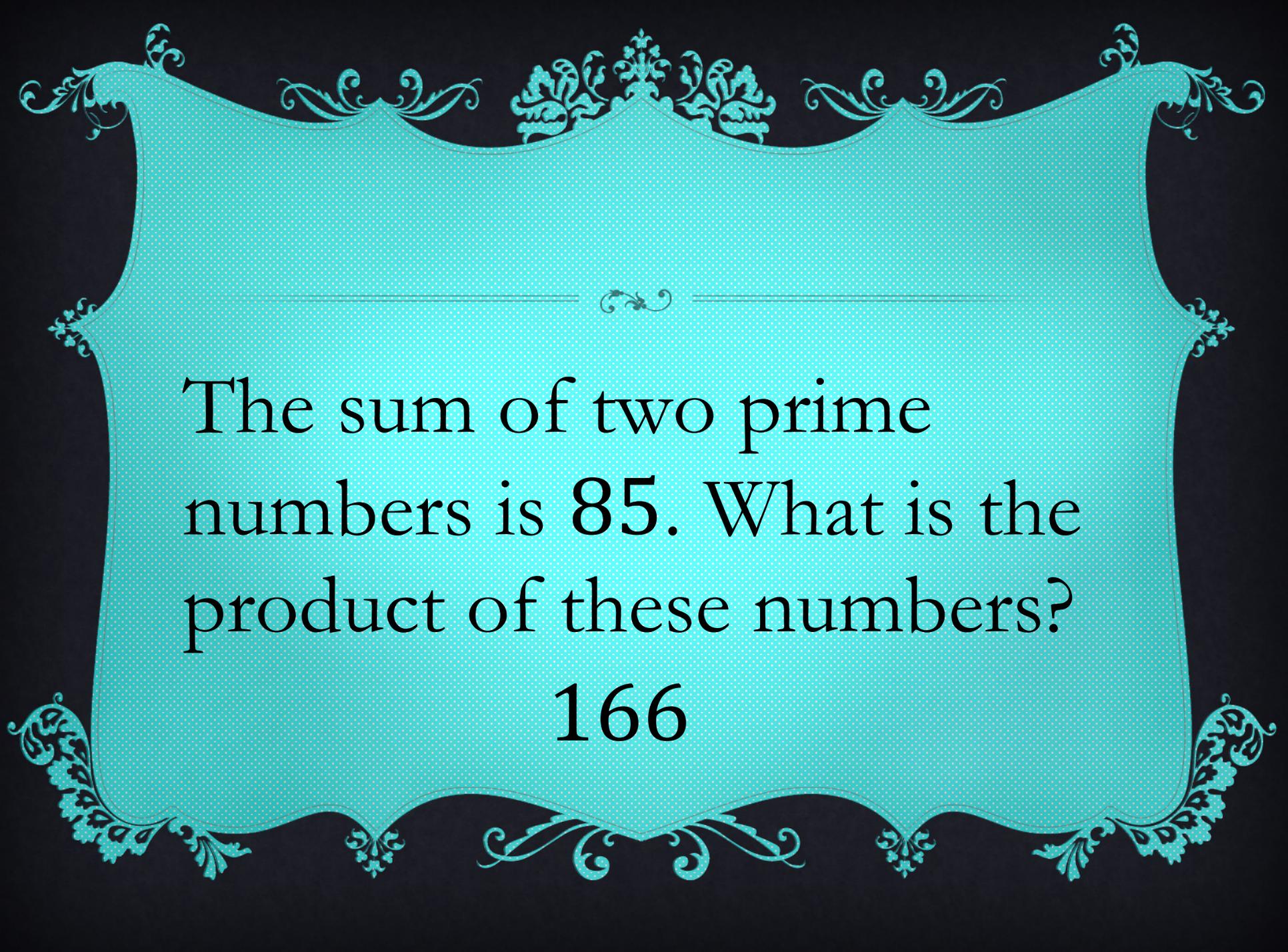


How many positive 5-digit odd integers are palindromes?

500



The sum of two prime numbers is 85. What is the product of these numbers?



The sum of two prime numbers is 85. What is the product of these numbers?

166



**END OF  
FINAL ROUND**