MATHEMATICS · GRADES 10-12

Tangent graphs

Difficulty level: Advanced

Mathematics: Grades 10-12

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Overview of the concept

This is how you read a graph that climbs without limit and then jumps, like the angle of a ramp getting steeper and steeper, instead of expecting it to behave like a smooth wave. A tangent graph rises faster and faster until it shoots off the top, then starts again from the bottom, over and over. That jumping pattern is completely different from the gentle wave of a sine or cosine graph. Knowing what to expect stops you from reading it wrong, and lets you see where it climbs steeply and where it restarts.

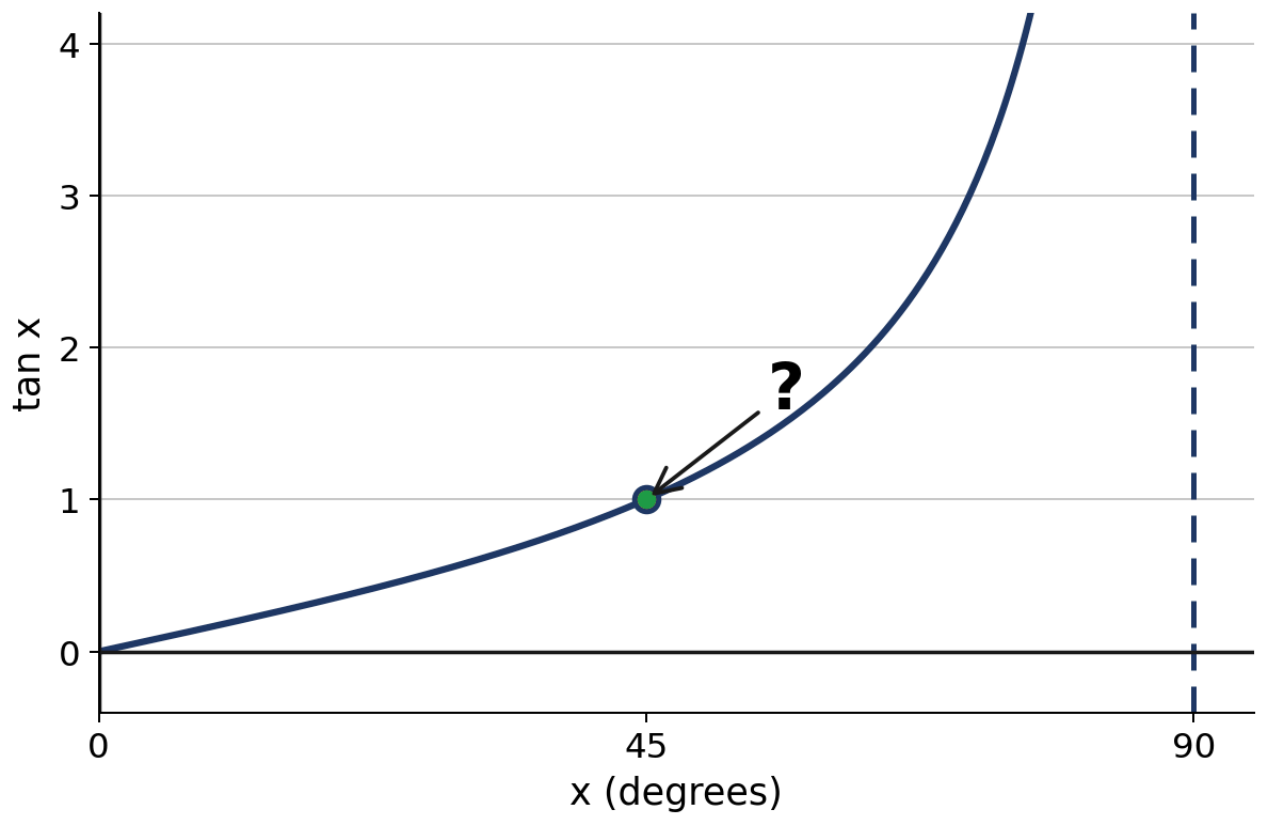


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Worked examples

EXAMPLE 1

Q Find tan 45 degrees from the tangent graph.



SOLUTION

At 0 degrees, tan is 0, and the graph rises steadily.

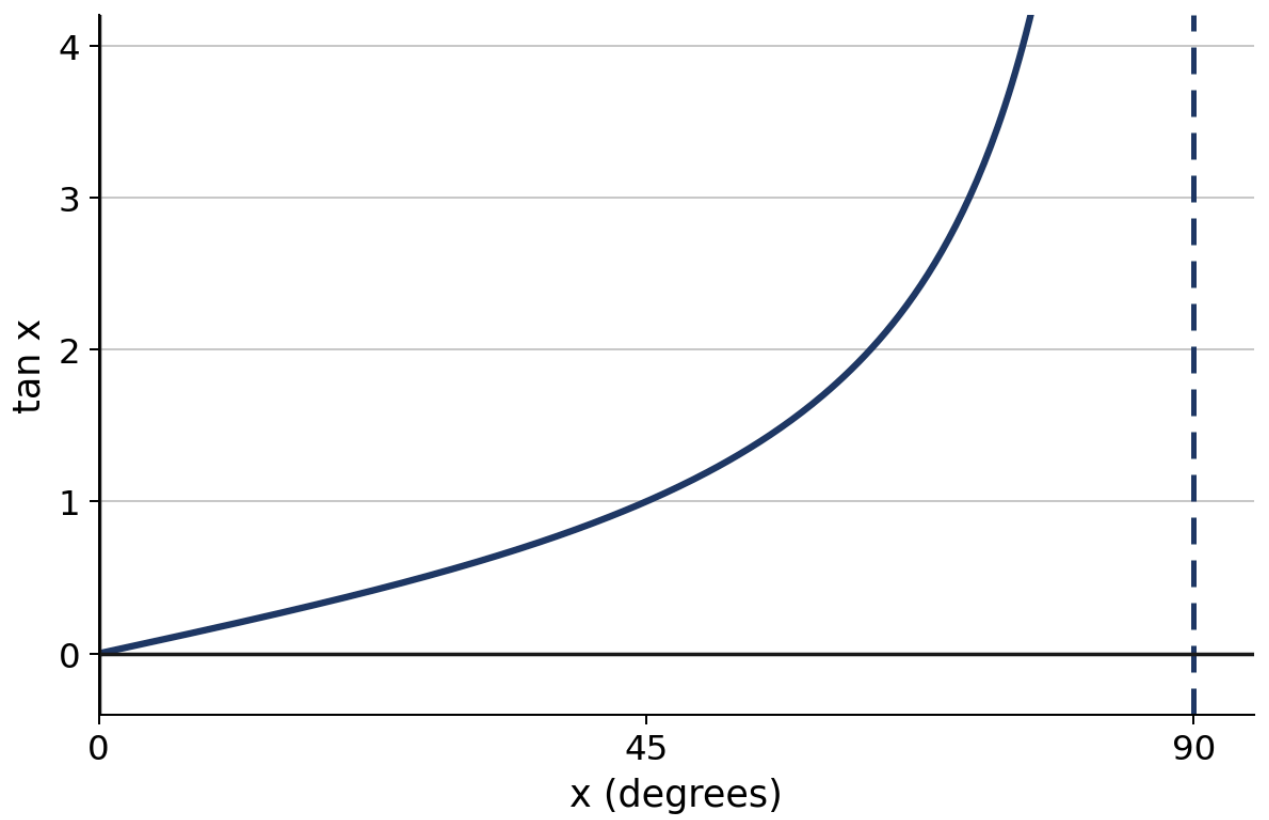
At 45 degrees it reaches 1.

So tan 45 degrees = 1

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EXAMPLE 2

Q What happens to tan x at 90 degrees?



SOLUTION

As x gets close to 90 degrees, tan x grows larger and larger.

$$\tan x = \frac{\sin x}{\cos x}$$

$$\tan 90 \text{ degrees} = \frac{\sin 90 \text{ degrees}}{\cos 90 \text{ degrees}} = \frac{1}{0}$$

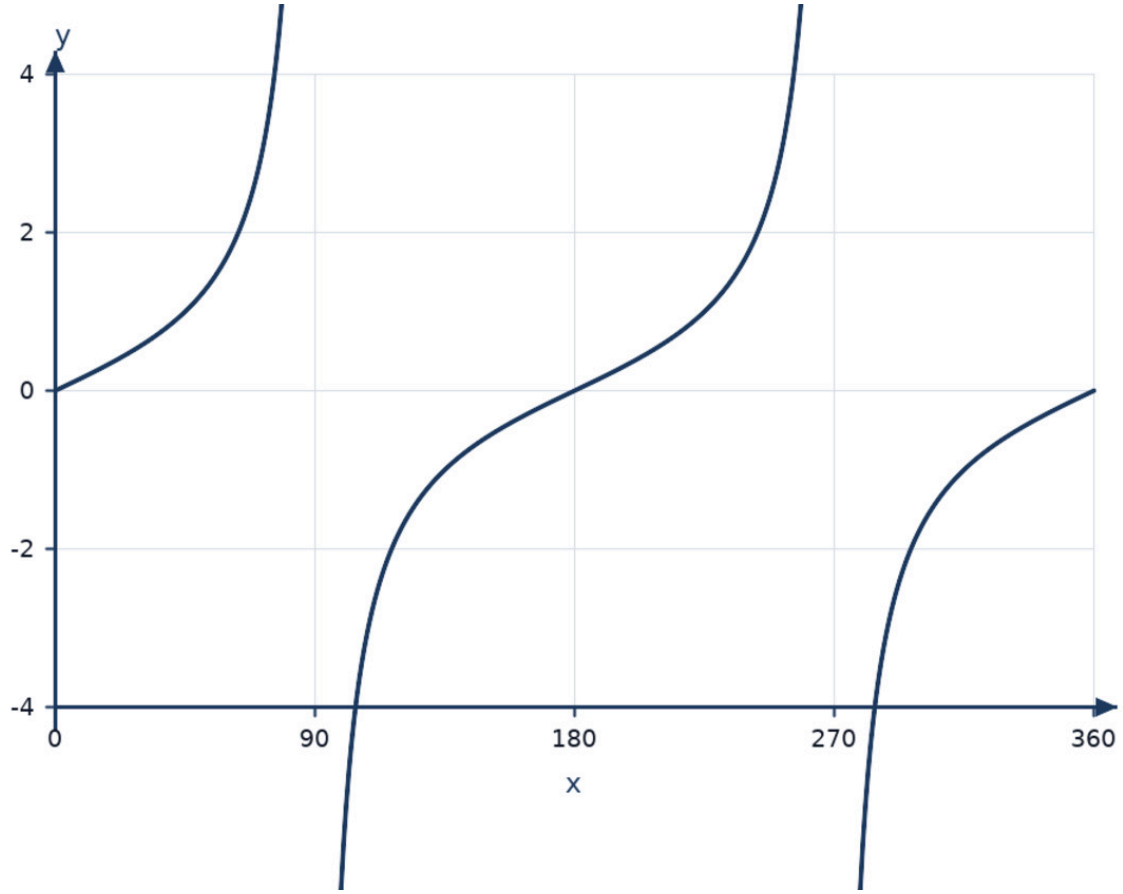
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The graph has a vertical asymptote at 90 degrees.

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Practice questions

1 At 0 degrees, what is tan 0 degrees?



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2 Find tan 60 degrees.

A 1

B $\sqrt{3}$

C 0

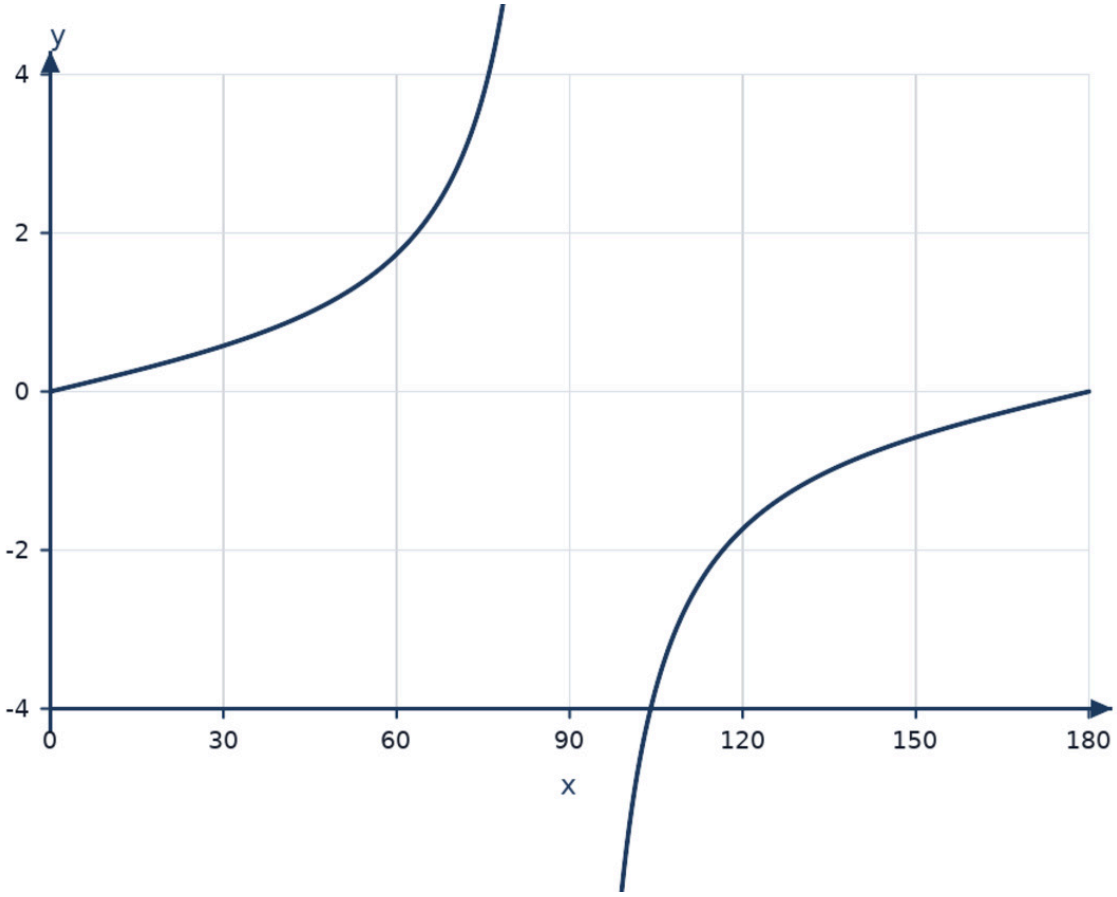
D $\frac{\sqrt{3}}{3}$

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3

A tangent graph has a vertical asymptote at 90 degrees. Does tan 270 degrees have a value?



A Yes

B No

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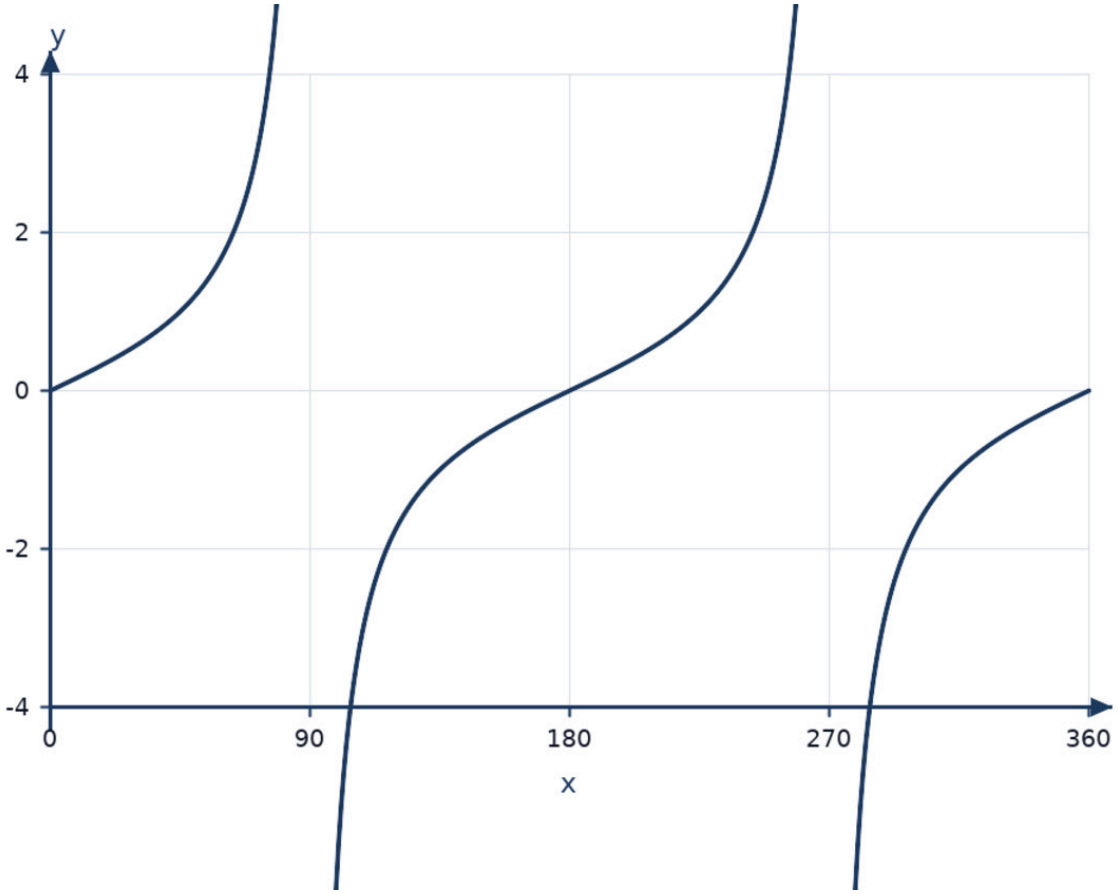
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4 What is the period of a tangent graph, in degrees?

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5 At 180 degrees, what is tan 180 degrees?



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6

As x approaches 90 degrees from below, what does tan x approach?

A Positive infinity

B Negative infinity

C 0

D 1

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A tangent graph has vertical asymptotes. Which of these is one, in degrees?

A 45 degrees

B 90 degrees

C 180 degrees

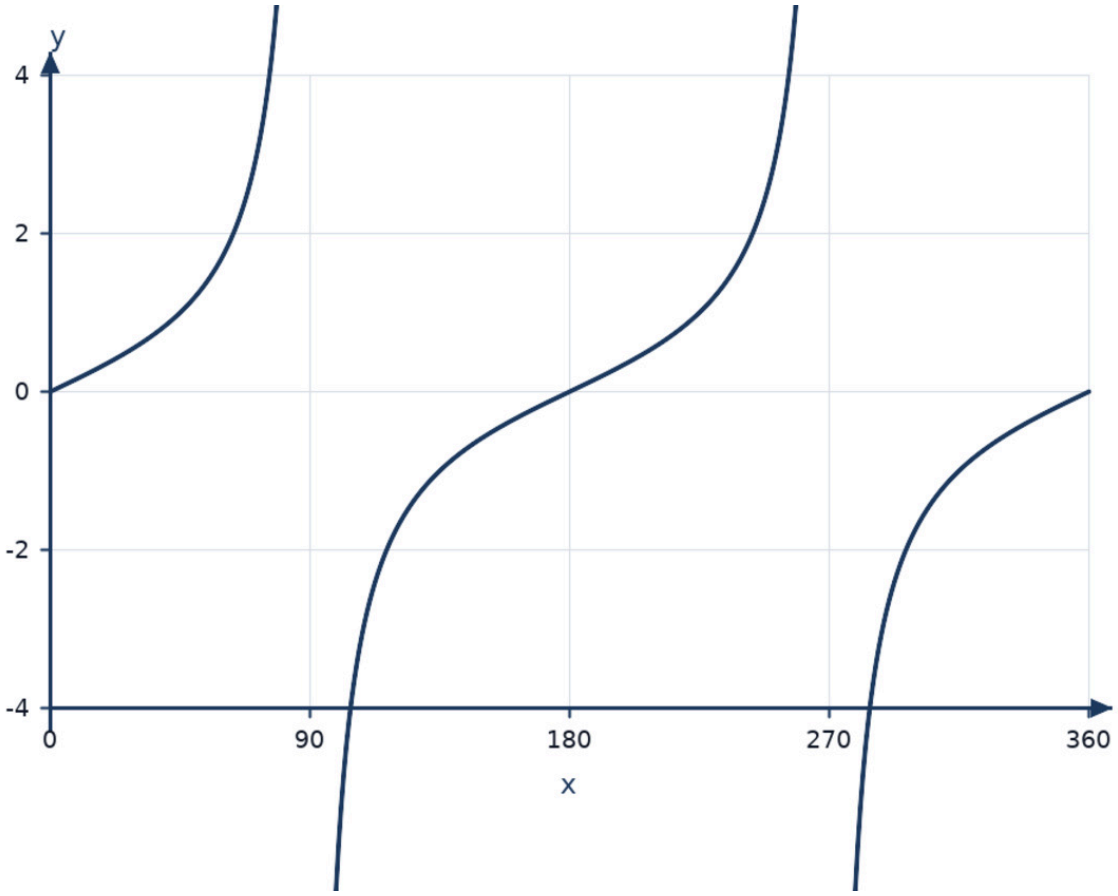
D 0 degrees

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8

Find tan 135 degrees.

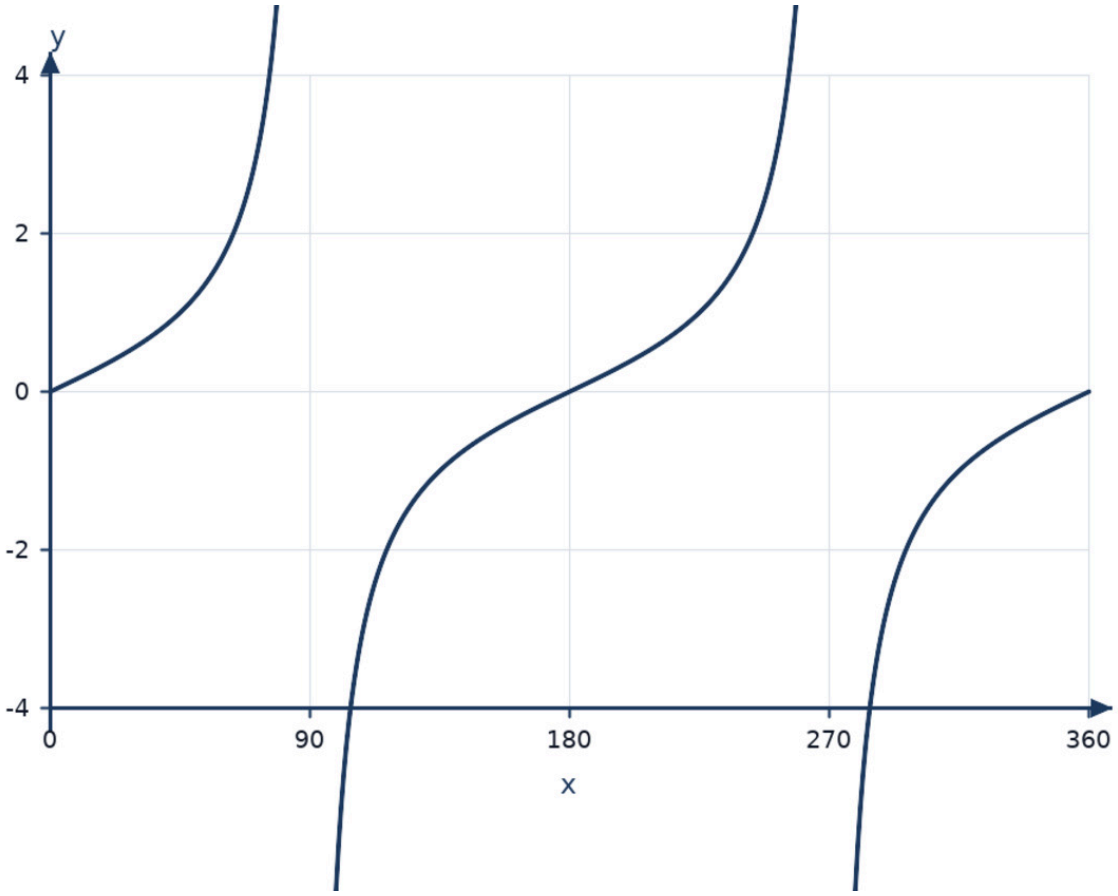


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9 Is a tangent graph smooth everywhere?



A Yes

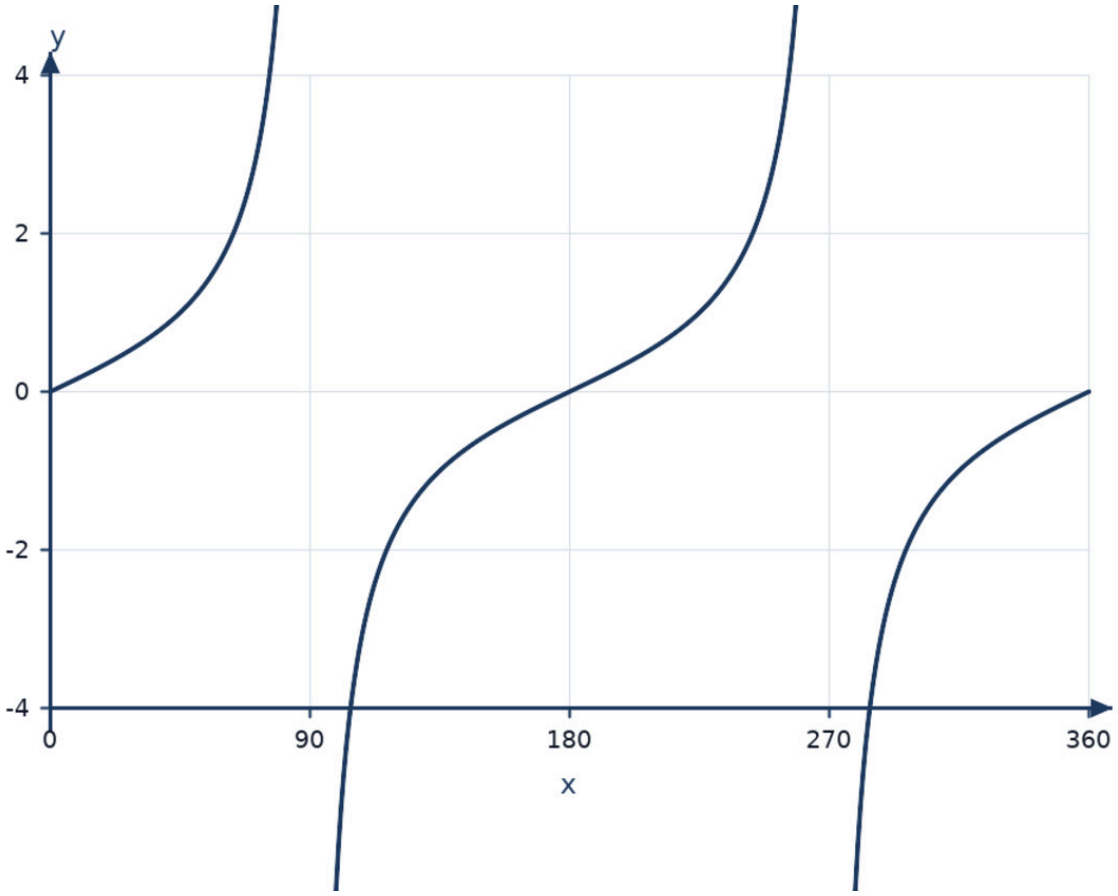
B No

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10 **Find tan 225 degrees.**



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ANSWER KEY

1. 0

2. $\sqrt{3}$

3. No

4. 180 degrees

5. 0

6. Positive infinity

7. 90 degrees

8. -1

9. No

10. 1

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