Guide to:
Trigonometric & exp. Graphs

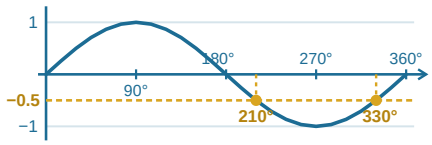
maths Links

Explanation:

Both **y = sin x** and **y = cos x** oscillate between −1 and 1 with a period of **360°**: sin x starts at (0°, 0), peaks at (90°, 1), crosses at (180°, 0), reaches (270°, −1), and returns to (360°, 0); cos x starts at (0°, 1) and is symmetrical about x = 180°. **y = tan x** has period 180° with vertical asymptotes at 90° and 270°.

Exponential graphs **$y = ab^x$** ($b > 0$) always pass through **(0, a)** because $b^0 = 1$, and have the x-axis ($y = 0$) as a horizontal asymptote. When $b > 1$ the graph shows exponential growth; when $0 < b < 1$ it shows exponential decay.

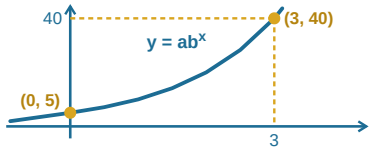
Example 1: Solve $\sin x = -0.5$ for $0° \le x \le 360°$.



Solution:

Base acute angle: $\sin^{-1}(0.5) = \mathbf{30°}$
sin x is negative in $180° < x < 360°$ (by wave symmetry):
$x = 180° + 30° = 210°$ and $x = 360° - 30° = 330°$
Answer: x = 210° and x = 330°

Example 2: The curve $y = ab^x$ passes through (0, 5) and (3, 40). Find a and b.



Solution:

Substitute (0, 5): $5 = a \times b^0 \Rightarrow \mathbf{a = 5}$
Substitute (3, 40) into $y = 5b^x$: $40 = 5b^3$
$b^3 = \frac{40}{5} = 8 \Rightarrow b = \sqrt[3]{8} = 2$
Answer: a = 5, b = 2

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