AP CALCULUS
CREATE THE
QUIZ

1 Find the derivative of $\ln|\cos \sqrt{(x-13)}|$.

    A. $-\tan \sqrt{(x-13)} / 2\sqrt{(x-13)}$

    B. $\sin \sqrt{(x-13)} \sec \sqrt{(x-13)} / 2\sqrt{(x-13)}$

    C. $-\tan \sqrt{(x-13)}$

    D. $\sec \sqrt{(x-13)} / 2\sqrt{(x-13)}$

3 Let $f(x) = (e^x + e^{-x} + 2) / (e^x + 1)$. What is $f'(x)$?

    A. $e^x - 2e^{-x}$

    B. e^{-x}

    C. $-e^x$

    D. $-e^{-x}$

4 Apple Music released the 1989 Tour Movie on Dec. 20. Normally, the rate (streams/day) that swifties stream the movie can be modeled by $S(t) = 600e^{-x/70} + \cos(2/7\ \pi x) + 1$, where t is the *number of days since the release. This model* **do***es not work for* **the holiday period from** Dec. 20 to Jan. 3 ($t = [0, 14]$), but Apple's servers counted 22,000 streams during this interval. Usin**g calcul**us, which is the**n th**e best prediction for the total number of streams the 1989 Movie will have by May 8th ($t = 140$)?

    A. $42,000/\sqrt[5]{e} - 42,000/e^2 + 126$

    B. $42,000/\sqrt[5]{e} - 42,000/e^2 + 22126$

    C. $42,000/\sqrt[5]{e} - 42,000/e^2 + 140$

    D. $-42000/e^2 + 7/2\pi \sin(40\pi) + 140$

Correct answer: B

$$\int S(t) = -42000e^{-x/70} + 7/2\pi \sin(2/7\ \pi x) + x + c$$

$$\int_0^{14} S(t) = 22000$$

$$\int_{14}^{140} S(t) = (-42000/e^2 + 7/2\pi \sin(40\pi) + 140) -$$
$$(-42,000/\sqrt[5]{e} + 7/2\pi \sin(4\pi) + 14)$$
$$= 42,000/\sqrt[5]{e} - 42,000/e^2 + 126$$

$$\int_0^{140} S(t) = \int_0^{14} S(t) + \int_{14}^{140} S(t)$$
$$= 22000 + 42,000/\sqrt[5]{e} - 42,000/e^2 + 126$$
$$= 42,000/\sqrt[5]{e} - 42,000/e^2 + 22126$$