## 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.  $-e^{-x}$
- 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 does 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. Using calculus, which is then the best prediction for the total number of streams the 1989 Movie will have by May 8th (t = 140)?

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

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

- C.  $42,000/5\sqrt{e} 42,000/e^2 + 140$
- D.  $-42000/e^2 + 7/2\pi \sin(40\pi) + 140$

**Correct answer: B** 

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

$$\int_{0}^{14} S(t) = 22000$$

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

$$= 42,000/^{5}\sqrt{e} - 42,000/e^{2} + 126$$

$$\int_{0}^{140} S(t) = \int_{0}^{14} S(t) + \int_{14}^{140} S(t)$$

$$= 22000 + 42,000/^{5}\sqrt{e} - 42,000/e^{2} + 22126$$