BC #1

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* looking for how many runners are 0min to 8min from the finish line

Thus integrate

$$\int_0^8 20\left[1-\cos(1+0.03x^2)\right]dx$$

plug into your calc

MATH → fnInt$\left(20(1-\cos(1+0.03x^2)), x, 0, 8\right)$

$= 166.396$

$= \boxed{166}$ D

BC #1

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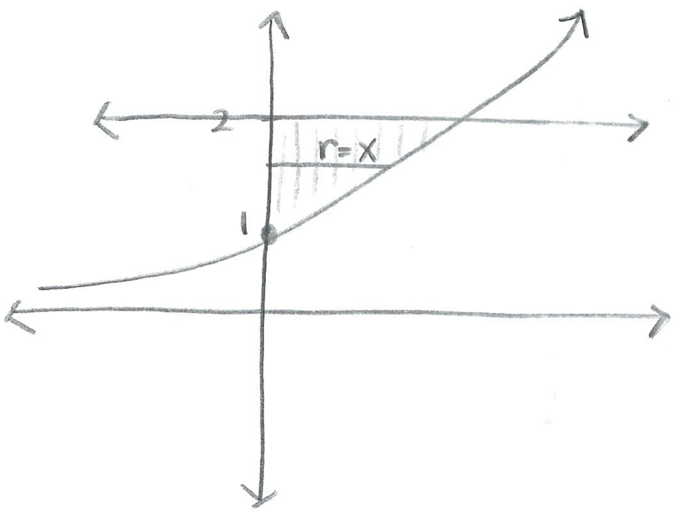
36. Find the volume of the solid generated when the region bounded by the y-axis, $y = e^x$, and $y = 2$ is rotated around the y-axis.

(A) 0.296 (B) 0.592 (C) 2.427 (D) 3.998 (E) 27.577

graph $y = e^x$ and $y = 2$



when rotated around the y-axis, we get a circle shape, thus we will use the formula πr^2

with $r = x$, we have

πx^2

since we are integrating along the y-axis from 1 to 2, we need to write $y = e^x$ in terms of y

$\ln y = \ln e^x$ $\ln y = x$

now plug in

$\int_1^2 \pi (\ln y)^2\, dy = \boxed{.592}$ B

plug in

BC #1

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37. If $f(t) = \int_0^{t^2} \frac{1}{1+x^2}\,dx$, then $f'(t)$ equals

(A) $\frac{1}{1+t^2}$ (B) $\frac{2t}{1+t^2}$ (C) $\frac{1}{1+t^4}$ (D) $\frac{2t}{1+t^4}$ (E) $\tan^{-1} t^2$

$$\frac{d}{dt} f(t) = \frac{d}{dt}\int_0^{t^2} \frac{1}{1+x^2}\,dx$$

* take derivative of both sides

plug t^2 into x, times the derivative of t^2

$$f'(t) = \frac{1}{1+(t^2)^2} \cdot 2t$$

$$= \boxed{\frac{2t}{1+t^4}}$$

D