Check Your Knowledge 7

ⓘ This is a preview of the published version of the quiz

Started: Dec 15 at 10:25pm

Quiz Instructions

Question 1

1 pts

Find the area enclosed by the parabolic functions $x = 4y^2$ and $x = -2y^2 + 3$.

- ○ $2\sqrt{2}$
- ○ $\frac{3\sqrt{3}}{2}$
- ○ $\frac{2\sqrt{5}}{3}$
- ○ $-\sqrt{3}$

Question 2

1 pts

Find the volume of the solid obtained by rotating about the x-axis the region under the curve $f(x) = x[\ln(x) + 1]$, $x > 0$, from $x = 1/e$ and $x = 1$.

- ○ $\frac{\pi}{27}\left(5 - \frac{2}{e^3}\right)$
- ○ $\frac{\pi}{24}\left(2 - \frac{3}{e^2}\right)$
- ○ $\frac{\pi}{20}\left(1 - \frac{1}{e^3}\right)$
- ○ $\frac{\pi}{26}\left(\frac{1}{3} - \frac{2}{e^3}\right)$

Question 3

1 pts

Consider the parabolas $f(x) = (x-2)^2 + 1$ and $g(x) = 3 - (x-2)^2$. Find the volume obtained by rotating about the x-axis the region between the two curves.

- ○ $\frac{4\sqrt{10}}{3}$
- ○ $-\frac{23}{2}$

- $\frac{30}{4}$
- $\frac{32\pi}{3}$

Question 4

1 pts

The force between two atoms in distance x of a diatomic molecule is given by $f(x) = \frac{\kappa}{x^{13}} + \frac{\lambda}{x^7}$, $\kappa, \lambda \in \mathbb{R}^+$. One atom stands still and the other is moving along the line joining them. Find the work consumed when the distance from $a = 1$ becomes $b = 1/2$.

- $-\frac{1234\kappa}{3} + \frac{23\lambda}{3}$
- $-\frac{1365\kappa}{4} - \frac{21\lambda}{2}$
- $-\frac{1165\lambda}{4} - \frac{21\kappa}{2}$
- $\frac{2\kappa}{13} + \frac{10\lambda}{7}$

Question 5

1 pts

Find the expression of the function $f : \mathbb{R}_+^* \to \mathbb{R}_+$ for which the graph passes through the point $M(1, 2)$ and the tangent line at each point $K(x, y)$ has the slope $\dfrac{1}{xy}$.

- $f(x) = \sqrt{\ln(2x^3) - 4}, \quad x \in (0, \infty)$
- $f(x) = \sqrt{\log(x^2) + 1}, \quad x \in (0, \infty)$
- $f(x) = \sqrt{\ln(x^2) + 4}, \quad x \in (0, \infty)$
- $f(x) = \sqrt[3]{\ln(x^2) + 11}, \quad x \in (0, \infty)$

Question 6

1 pts

In a town of N people at the time $t = 0$ a news story is announced to $1/1001$ of the population. The rate of spreading this news $\left(\dfrac{\mathrm{d}y}{\mathrm{d}t}\right)$ is propotional to the number y of people in the town who know the news and the number $(N - y)$ who ignore it. Find out how many months it takes for the news to spread to $2/3$ of the town population, if in 1 month it spread to half of the population.

-

$1 + \frac{1}{3}\log_{10}(2)$ months

- $\frac{5}{2}$ months
- $2 + \frac{1}{2}\log_2(4)$ months
- $3 + \frac{1}{4}\ln(2)$ months

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