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Question # P

Find the equation in slope-intercept form of the tangent line to $f(x) = \ln x^2$ at $x = e$.

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Question # 1

Calculate the slope of the line normal to the graph of $y = \sqrt{1-x^2}$ at the point where $x = \frac{\sqrt{2}}{2}$.

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Question # 2

Evaluate: $\int 3\left(2x^2+7\right)^4 dx$

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Question # 3

What is the third smallest natural number with exactly 15 positive integral factors?

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Question # 4

The curve $y = x^2$ is revolved about the y-axis to form a container. If liquid flows into the container at a rate of 5 cubic units/min, how fast in units/min is the depth of the liquid, in terms of π, changing when the volume of the liquid is 18π units^3?

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Question # 4

The curve $y = x^2$ is revolved about the y-axis to form a container. If liquid flows into the container at a rate of 5 cubic units/min, how fast in units/min is the depth of the liquid, in terms of π, changing when the volume of the liquid is 18π units^3?

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Question # 4

The curve $y = x^2$ is revolved about the y-axis to form a container. If liquid flows into the container at a rate of 5 cubic units/min, how fast in units/min is the depth of the liquid, in terms of π, changing when the volume of the liquid is 18π units^3?

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Question #4

The curve $y = x^2$ is revolved about the y-axis to form a container. If liquid flows into the container at a rate of 5 cubic units/min, how fast in units/min is the depth of the liquid, in terms of π, changing when the volume of the liquid is 18π units^3?

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Question # 5

Evaluate $\lim_{h\to 0}\dfrac{f(x+h)g(x+2h)-f(x)g(x)}{h}$ for $f(x)=2x^2,\ g(x)=\cos x$.

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Question # 5

Evaluate $\lim_{h\to 0}\dfrac{f(x+h)g(x+2h)-f(x)g(x)}{h}$ for $f(x)=2x^2,\ g(x)=\cos x$.

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Question # 5

Evaluate $\lim_{h\to 0}\dfrac{f(x+h)g(x+2h)-f(x)g(x)}{h}$ for $f(x)=2x^2,\ g(x)=\cos x$.

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Question # 5

Evaluate $\lim_{h\to 0}\dfrac{f(x+h)g(x+2h)-f(x)g(x)}{h}$ for $f(x)=2x^2,\ g(x)=\cos x$.

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Question # 6

The total volume of a cylinder is 2000π ft^3.
The surface area is a maximum when the radius is what length in feet?

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Question # 7

Find $\frac{dy}{dx}$ if $\ln\frac{y}{x} = \sin\left(x^2 + y^2\right)$.

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Find $\frac{dy}{dx}$ if $\ln\frac{y}{x} = \sin\left(x^2 + y^2\right)$.

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Find $\frac{dy}{dx}$ if $\ln\frac{y}{x} = \sin\left(x^2 + y^2\right)$.

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Question # 8

Consider triangle ABC with sides $AB = \sin x$, $BC = \cos x$, and angle $\angle ABC = x$, where $0 < x < \frac{\pi}{2}$.
What is the maximum area of triangle ABC?

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Question # 8

Consider triangle ABC with sides $AB = \sin x$, $BC = \cos x$, and angle $\angle ABC = x$, where $0 < x < \frac{\pi}{2}$.
What is the maximum area of triangle ABC?

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Question # 9

Find x if $\int_1^x \ln(t)\,dt = -1$.

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Question # 10

Evaluate

$$\frac{1}{3}+\frac{1}{2}+\frac{1}{9}+\frac{1}{2}+\frac{1}{27}+\frac{3}{8}+\frac{1}{81}+\frac{1}{4}+\frac{1}{243}+\frac{5}{32}\cdots.$$

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Question # 10

Evaluate

$$\frac{1}{3}+\frac{1}{2}+\frac{1}{9}+\frac{1}{2}+\frac{1}{27}+\frac{3}{8}+\frac{1}{81}+\frac{1}{4}+\frac{1}{243}+\frac{5}{32}\cdots.$$

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Question # 11

Given that $f(x) = x^3 - \sin^2(x)$, evaluate $f'\left(\frac{\pi}{12}\right)$.

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Question # 12

Evaluate: $\sum_{x=0}^{90} \cos(2x)$

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