Circuit Training

Ready to tackle a circuit covering an entire year of Calculus content? Start with the problem in the upper left box, then search for your answer in a different cell. Mark the new cell #2 and continue in the circuit until you end up back at the beginning. No calculators needed!

Answer: $\frac{e^2+5}{4e^2}$ # ___1___ Write the equation of the line tangent to the graph of $f(x) = -3x^2 + 5x + 1$ at $x = 1$ and use it to approximate $f(1.2)$.	Answer: 1 # _____ Find the instantaneous rate of change of $g(x) = \ln(x + 3)$ at $x = \frac{1}{2}$.
Answer: $\frac{2}{7}$ # _____ $\int_0^2 x\sqrt{4 - x^2}\, dx$	Answer: $\sqrt{19}$ # _____ Let R be the region bounded by the graph of $y = \sqrt{x - 3}$, the line $x = 4$, and the $x-$axis. Calculate the volume of the solid generated when region R is rotated around the $x-$ axis.
Answer: $\frac{14}{5}$ # _____ If $y = \tan\left(\frac{x}{3}\right)$, find $y'\left(\frac{\pi}{2}\right)$.	Answer: 0 # _____ $\int_1^e \frac{1}{x}\, dx$

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Answer: $\frac{1}{4}$

\# _____ If $y = \frac{x-5}{\ln x}$, find $y'(e^2)$.

Answer: $\frac{3}{2}$

\# _____ Find $\frac{dy}{dx}$ for $x^2 + y^2 = 169$ at the point $(-5, 12)$.

Answer: $\frac{4}{9}$

\# _____ Find the area between the graph of $y = 3x^2 + x$ and the x −axis between $x = 0$ and $x = 1$.

Answer: $\frac{8}{3}$

\# _____ Find the particular solution $y = h(x)$ to the differential equation $\frac{dy}{dx} = \frac{x^2}{y}$ with initial condition $h(0) = 1$. Then find $h(3)$.

Answer: $\frac{5}{12}$

\# _____ $\lim\limits_{x \to -\infty} \frac{x - 5x^2}{x^3 + 10x}$

Answer: $\frac{\pi}{2}$

\# _____ $\lim\limits_{h \to 0} \frac{\sqrt{4+h} - 2}{h}$

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