

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!

<p>Answer: $\frac{e^2+5}{4e^2}$</p> <p># <u> 1 </u> 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 $f(1.2)$.</p>	<p>Answer: 1</p> <p># <u> </u> Find the instantaneous rate of change of $g(x) = \ln(x + 3)$ at $x = \frac{1}{2}$.</p>
<p>Answer: $\frac{2}{7}$</p> <p># <u> </u> $\int_0^2 x\sqrt{4-x^2} dx$</p>	<p>Answer: $\sqrt{19}$</p> <p># <u> </u> 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.</p>
<p>Answer: $\frac{14}{5}$</p> <p># <u> </u> If $y = \tan\left(\frac{x}{3}\right)$, find $y'\left(\frac{\pi}{2}\right)$.</p>	<p>Answer: 0</p> <p># <u> </u> $\int_1^e \frac{1}{x} dx$</p>

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: $\frac{5}{12}$

_____ $\lim_{x \rightarrow -\infty} \frac{x-5x^2}{x^3+10x}$

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

_____ $\lim_{h \rightarrow 0} \frac{\sqrt{4+h}-2}{h}$