

Circuit Training – CHAIN Rule

Name _____

Directions: Begin in cell #1. Take the derivative. Search for your answer. Continue in this manner until you complete the circuit. In some cases, you will need to evaluate the derivative, answer a question, or perhaps find the second derivative. Additional paper may be necessary! No technology is needed!

<p>Answer: 2</p> <p># <u>1</u> $f(x) = (x^2 + 7)^5$, $f'(x) = ?$</p>	<p>Answer: $\frac{8}{9}$</p> <p># _____ $f(x) = \sin(x^2)$, $f''(x) = ?$</p>
<p>Answer: $\frac{4}{3}$</p> <p># _____ $f(x) = \tan^2(3x^2)$, $f'(x) = ?$</p>	<p>Answer: -2</p> <p># _____ $f(x) = \csc\left(\frac{x}{3}\right)$, $f'(\pi) = ?$</p>
<p>Answer: $2x \cos(x^2 + 7)$</p> <p># _____ $f(x) = (x^2 + 7)^{3/2}$, $f'(x) = ?$</p>	<p>Answer: $10x(x^2 + 7)^4$</p> <p># _____ $f(x) = 5\sqrt{x^2 + 7}$, $f'(x) = ?$</p>
<p>Answer: $\frac{-3x \sec^2(3x^2)}{\sqrt{(\tan(3x^2))^3}}$</p> <p># _____ $g(\theta) = \cos(3\theta + \pi)$, $g'\left(\frac{\pi}{4}\right) = ?$</p>	<p>Answer: $2x \sec(x^2 + 7) \tan(x^2 + 7)$</p> <p># _____ $f(x) = \sqrt[3]{x^2 + 7} \cos x$, $f'(x) = ?$</p>
<p>Answer: $4x \sin(x^2) \cos(x^2)$</p> <p># _____ $g(x) = 2x\sqrt{x^2 + 7}$, $g'(x) = ?$</p>	<p>Answer: $\frac{5x}{\sqrt{x^2 + 7}}$</p> <p># _____ $g(x) = \sin(x^2 + 7)$, $g'(x) = ?$</p>

<p>Answer: $3x\sqrt{x^2+7}$</p> <p># _____ $y = \sin^2(x^2)$, $y' = ?$</p>	<p>Answer: -4</p> <p># _____ $g(t) = (t^3 - 2)^7$, $g'(1) = ?$</p>																																			
<p>Answer: $2 \cos(x^2) - 4x^2 \sin(x^2)$</p> <p># _____ For what value of t does $y = \frac{\sqrt{3t-2}}{t}$ have a horizontal tangent?</p>	<p>Answer: $-\csc x(\cot^2 x + \csc^2 x)$</p> <p># _____ $h(x) = \sec(x^2 + 7)$, $h'(x) = ?$</p>																																			
<p>Answer: $\frac{\frac{2}{3}x \cos x - 7 \sin x - x^2 \sin x}{\sqrt[3]{(x^2+7)^2}}$</p> <p># _____ The functions $f(x)$ and $g(x)$ are differentiable with select values in the table. Let $h(x) = f(g(x))$. What is $h'(2)$?</p> <table border="1" data-bbox="94 1024 797 1182"> <thead> <tr> <th>x</th> <th>$f(x)$</th> <th>$f'(x)$</th> <th>$g(x)$</th> <th>$g'(x)$</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>2</td> <td>-4/3</td> <td>5</td> <td>0</td> </tr> <tr> <td>2</td> <td>1/2</td> <td>5</td> <td>-1</td> <td>3</td> </tr> <tr> <td>5</td> <td>0</td> <td>1.2</td> <td>π</td> <td>10</td> </tr> </tbody> </table>	x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$	-1	2	-4/3	5	0	2	1/2	5	-1	3	5	0	1.2	π	10	<p>Answer: $12x \tan(3x^2)\sec^2(3x^2)$</p> <p># _____ The functions $f(x)$ and $g(x)$ are differentiable with select values in the table. Let $p(x) = f(x) \cdot g(f(x))$. What is $p'(5)$?</p> <table border="1" data-bbox="824 1024 1528 1146"> <thead> <tr> <th>x</th> <th>$f(x)$</th> <th>$f'(x)$</th> <th>$g(x)$</th> <th>$g'(x)$</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1/3</td> <td>π</td> <td>-4</td> <td>6</td> </tr> <tr> <td>5</td> <td>2</td> <td>1/4</td> <td>0</td> <td>-6</td> </tr> </tbody> </table>	x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$	2	1/3	π	-4	6	5	2	1/4	0	-6
x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$																																
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<p>Answer: $\frac{3\sqrt{2}}{2}$</p> <p># _____ $r(t) = \frac{3}{(t^2-2t)^2}$, $r'(-1) = ?$</p>	<p>Answer: $-\frac{2}{9}$</p> <p># _____ $g(x) = \frac{1}{\sqrt{\tan(3x^2)}}$ $g'(x) = ?$</p>																																			
<p>Answer: 21</p> <p># _____ Given: $g(x) = 3x^2 - 6x$, $h(x) = \sqrt{x}$ If $f(x) = h(g(x))$, then $f'(-1) = ?$</p>	<p>Answer: $\frac{4x^2+14}{\sqrt{x^2+7}}$</p> <p># _____ $y = \frac{\cos x}{\sin^2 x}$, $\frac{dy}{dx} = ?$</p>																																			