

✓ Congratulations! You passed!

Next Item



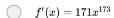
1/1 point

1

In the following quiz, you'll apply the rules you learned in the previous videos to differentiate some functions.

We learned how to differentiate polynomials using the power rule: $\frac{d}{dx}(ax^b) = abx^{b-1}$. It might be helpful to remember this as 'multiply by the power, then reduce the power by one'.

Using the power rule, differentiate $f(x) = x^{173}$.



$$f'(x) = 174x^{172}$$

Correct

The power rule makes differentiation of terms like this easy, even for large and scary looking values of b.

$$f'(x) = 172x^{173}$$



1/1 point

2.

The videos also introduced the sum rule: $\frac{\mathrm{d}}{\mathrm{d}x}\left[f(x)+g(x)\right]=\frac{\mathrm{d}f(x)}{\mathrm{d}x}+\frac{\mathrm{d}g(x)}{\mathrm{d}x}$.

This tells us that when differentiating a sum we can just differentiate each term separately and then add them together again. Use the sum rule to differentiate $f(x)=x^2+7+rac{1}{x}$

$$\int f'(x)=2x-rac{1}{x^2}$$

Correct

The sum rule allows us to differentiate each term separately.



1/1 point

3.

In the videos we saw that functions can be differentiated multiple times. Differentiate the function $f(x) = e^x + 2\sin(x) + x^3$ twice to find its second derivative, f''(x).

$$f''(x) = e^x - 2\sin(x) + 6x$$

$$f''(x) = e^x + \sin(x) + 3x^2$$



1/1 point

4.

Previous videos introduced the concept of an anti-derivative. For the function f'(x), it's possible to find the anti-derivative, f(x), by asking yourself what function you'd need to differentiate to get f'(x). For example, consider applying the "power rule" in reverse: You can go from the function abx^{b-1} to its antiderivative ax^b .

Which of the following could be anti-derivatives of the function $f'(x)=x^4-\sin(x)-3e^x$? (Hint: there's more than one correct answer...)



$$f(x) = \frac{1}{5}x^5 + \cos(x) - 3e^x + 4$$

Correct

Differentiating f(x) gives the intended f'(x). We also see that when calculating anti-derivatives we can add any constant, since the derivative of a constant is zero. We might write this as $f(x) = \frac{1}{5}x^5 + \cos(x) - 3c^x + c$, where c can be any constant.



$$f(x) = \frac{1}{5}x^5 + \cos(x) - 3e^x - 12$$

Correct

Differentiating f(x) gives the intended f'(x). We also see that when calculating anti-derivatives we can add any constant, since the derivative of a constant is zero. We might write this as $f(x) = \frac{1}{5}x^5 + \cos(x) - 3c^x + c$, where c can be any constant.



$$f(x) = 4x^3 - \cos(x) - 3e^x$$

Un-selected is correct



$$f(x) = 5x^5 - \sin(x) + 3e^x + 7$$

Un-selected is correct



$$f(x) = \frac{1}{5} \frac{x^5}{\cos(x)} \frac{3e^x}{\sin(x)}$$

Un-selected is correct



The power rule can be applied for any real value of b. Using the facts that $\sqrt{x=x^{\frac{1}{2}}}$ and $x^{-a}=\frac{1}{x^{a}}$, calculate $\frac{d}{dx}(\sqrt{x})$.



$$\frac{d}{dx}(\sqrt{x}) = \frac{1}{2\sqrt{x}}$$

Correct

This can also be useful when the power is a negative number. If you'd like to you can check that the power rule agrees with the derivative of $\frac{1}{n}$ that you've already seen.

()	$d \left(\begin{array}{c} m \end{array} \right) = 1$	
	$L^{2}t^{r}$ s differentiate some functions	
	d Practice Quiz, 5 questions	5/5 points (100%)
	$\frac{1}{dx}(\nabla^{\mathcal{X}}) = \frac{1}{2}\nabla^{\mathcal{X}}$	
	$d\left(\sqrt{m}\right) = \frac{2}{2}$	
	$\frac{1}{dx}(\nabla^{2}) = \frac{1}{x^{2}}$	

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