

5/5 points (100%)

# ✓ 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:  $\frac{\mathrm{d}}{\mathrm{d}x}\left(ax^{b}\right)=abx^{b-1}$ . It might be helpful to remember this as 'multiply by the power, then reduce the power by one'.

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



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

#### Correct

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

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

$$f'(x) = 171x^{173}$$

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



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  $f(x)=x^2+7+\frac{1}{x}$ 

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

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

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

# 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).

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

## 15/04/2019

You used the suntrue differentiate sound of unetions derivatives to calculate this. Well done!

Practice Quiz 5 questions

5/5 points (100%)

2/3

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



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 anti-derivative  $ax^b$ .

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...)

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

#### 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  $f(x) = \frac{1}{5}x^5 + \cos(x) - 3e^x + c$ , where c can be any constant.

#### 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  $f(x) = \frac{1}{5}x^5 + \cos(x) - 3e^x + c$ , where c can be any constant.

Un-selected is correct

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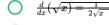
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1/1 point

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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  $\frac{d}{dx}(\sqrt{x})$ .



## 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  $\frac{1}{x}$  that you've already seen.

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

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



# Let's differentiate some functions Practice Quiz, 5 questions

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