



✓ Congratulations! You passed!

Next Item



1. In the following quiz, you will practice how to use the product rule. Some questions look tricky, but just stick to the rules you know!

1 / 1  
point

What is the differential of  $f(x)g(x)$ ?

- ☐  $f'(x)g'(x)$
- ☒  $f'(x)g(x) + f(x)g'(x)$

Correct  
Well done!

- ☐  $f'(x)g(x)$
- ☐  $f(x)g'(x)$



2. Using the product rule, differentiate with respect to  $x$  the function  $f(x) = (x + 2)(3x - 3)$ .

1 / 1  
point

- ☒  $f'(x) = 6x + 3$

Correct  
Well done! You can verify this by expanding out  $(x + 2)(3x - 3)$  and then differentiating the quadratic.

- ☐  $f'(x) = 3x + 3$
- ☐  $f'(x) = 3$
- ☐  $f'(x) = 3x + 6$



3. Using the product rule, differentiate with respect to  $x$  the function  $f(x) = e^x(x^2 + 7x - 3 - \sin(x))$ .

1 / 1  
point

- ☒  $f'(x) = e^x(x^2 + 9x + 4 - \sin(x) - \cos(x))$

Correct  
Well done!

- ☐  $f'(x) = xe^{x-1}(x^2 + 7x - 3) + e^x(2x + 7) - \cos(x)$
- ☐  $f'(x) = e^x(2x + 7 - \cos(x))$
- ☐  $f'(x) = xe^{x-1}(x^2 + 7x - 3 + \cos(x))$



4. Using the product rule, differentiate with respect to  $x$  the function  $f(x) = (x^2 - 2x + 5)(\sin(x) + \cos(x))$ .

1 / 1  
point

- ☒  $f'(x) = (x^2 + 3)\cos(x) - (x^2 - 4x + 7)\sin(x)$

Correct  
Well done!

- ☐  $f'(x) = (2x - 2)(\cos(x) - \sin(x))$
- ☐  $f'(x) = (2x - 5)(\cos(x) - \sin(x))$
- ☐  $f'(x) = (x^2 + 3)\sin(x) + (x^2 - 4x + 7)\cos(x)$




5. Using the product rule, differentiate with respect to  $x$  the function  $f(x) = e^x(3x - 2)\sin(x)$ .

1 / 1  
point

Hint: consider  $f(x)g(x)h(x)$  as  $[f(x)g(x)]h(x)$ , and use the product rule twice.

- ☐  $f'(x) = e^x(3\cos(x) - 2)$
- ☐  $f'(x) = 3e^x\cos(x)$
- ☒  $f'(x) = e^x((3x + 1)\sin(x) + (3x - 2)\cos(x))$

Correct  
The best way is to apply the product rule twice.

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

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