

Week 2
MATH 34B
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10.3 An artery has a circular cross section of radius 2 millimeters. The speed at which blood flows along the artery fluctuates as the heart beats. The speed after t seconds is $20 + 6 \sin(2\pi t)$ meters per second.

What volume of blood passes along the artery in one second?

- 10.5 (a) Use the product rule to find the derivative of $(3x + 3)(2x^5)$.
- (b) Now multiply out and work out the derivative again and check that the answers agree.
- (c) Now see what you get when you multiply the derivative of $(3x + 3)$ with the derivative of $(2x^5)$. Note how different this is and understand why when taking the derivative of a product, you MUST use the CORRECT PRODUCT RULE!

- 10.8 (a) $e^{3x} \ln(x)$
(b) $(9x^8 - 3) \sin(3x)$
(c) $\sin(2x) \cos(6x)$
(d) $(8x^7 + 2x^5) \sin(7x)$
(e) $4e^{7x} \sin(3x)$

9.5 Differentiate

(a) 10^x

(b) $5 \cdot 2^x$

9.13 Integrate: $\int_0^{\pi/10} \sin(5x) dx$

9.14 Find the area under one arch of the graph $y = \sin(6x)$.

B.1 Find a point x that maximizes $e^{(\sin^2(x)+\cos^2(x))^3}$. How many of them are there?