

November 4

When finding using the disk method for volumes of revolution, when do you need to be in terms of  $x$  and when do you need to be in terms of  $y$ ?



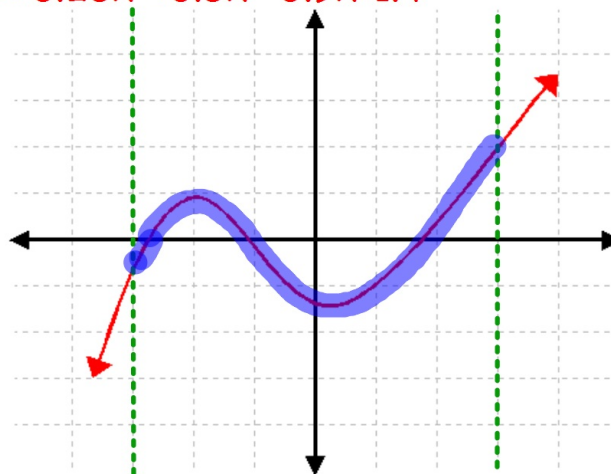
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Students will verbally explain how to find the average value of a function  
(using the words:  
integral, interval, ...)



Find the  
average value  
on the interval  
[-3, 3]

$$f(x) = 0.25x^3 + 0.5x^2 - 0.9x - 1.4$$



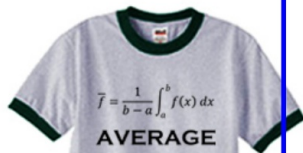
$$\frac{\int_{-3}^3 .25x^3 + .5x^2 - .9x - 1.4 dx}{3 - (-3)} = \frac{.6}{6} = .1$$

Average  
value  
of a  
function

$$\text{ave}(f) = \frac{\int_a^b f(x) dx}{b-a}$$

$$= \frac{1}{b-a} \int_a^b f(x) dx$$

$\underbrace{\hspace{1cm}}$   $\underbrace{\hspace{2cm}}$   
 ↓ sum of all  
 divided by y-values  
 the # of y-values



find the average  
value of  
 $f(x) = x^3 + 6x$   
on  $[2, 7]$

$$\frac{1}{7-2} \int_2^7 x^3 + 6x \, dx$$

$$= \frac{1}{5} \left( \frac{x^4}{4} + 3x^2 \right) \Big|_2^7$$

$$= \frac{1}{5} \left( \frac{7^4}{4} + 3(7^2) - \left[ \frac{2^4}{4} + 3(2^2) \right] \right)$$

$$= \frac{1}{5} \left( \frac{7^4}{4} + 147 - 4 - 12 \right) = \frac{1}{5} \left( \frac{7^4}{4} + 131 \right)$$

find the average  
value of  
 $f(x) = \sin(x) + \ln(x)$   
on  $\left[\frac{\pi}{4}, 6\right]$

$$\frac{1}{6 - \frac{\pi}{4}} \int_{\frac{\pi}{4}}^6 \sin x + \ln x \, dx = 1.049$$