

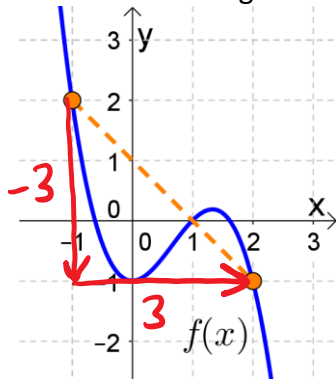
1. Find the average rate of change of $f(x) = \frac{1}{x}$ between $x = 1$ and $x = 4$.

$$\begin{aligned} \text{AROC} &= \frac{f(4) - f(1)}{4 - 1} \\ &= \frac{\frac{1}{4} - \frac{1}{1}}{3} \\ &= \frac{\left(\frac{-3}{4}\right)}{3} \quad \left(\frac{-3}{4}\right) = \frac{-\cancel{3}}{4} \cdot \frac{1}{\cancel{3}} \\ &= \boxed{-\frac{1}{4}} \end{aligned}$$

2. Find the average rate of change of $f(x) = -2x^2 + x - 3$ between $x = -1$ and $x = 2$.

$$\begin{aligned} \text{AROC} &= \frac{f(2) - f(-1)}{2 - (-1)} = \frac{-2(2)^2 + 2 - 3 - (-2(-1)^2 + (-1) - 3)}{3} \\ &= \frac{-9 - (-6)}{3} = \boxed{-1} \end{aligned}$$

4. Find the average rate of change of $f(x)$ (shown below) between the indicated points on the graph.



$$\text{AROC} = \frac{-3}{3} = \boxed{-1}$$

↖ The AROC is just the slope of the secant line.

6. Below is a table of the average price of ground beef in the U.S. (in dollars per pound).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005	2.191	2.229	2.218	2.309	2.363	2.338	2.299	2.422	2.377	2.206	2.302	2.303
2006	2.277	2.188	2.251	2.228	2.240	2.237	2.147	2.213	2.202	2.206	2.206	2.259
2007	2.185	2.304	2.292	2.254	2.307	2.333	2.366	2.395	2.372	2.260	2.289	2.234
2008	2.328	2.381	2.293	2.323	2.313	2.269	2.258	2.371	2.419	2.402	2.357	2.406
2009	2.357	2.436	2.269	2.251	2.257	2.234	2.147	2.134	2.138	2.177	2.062	2.186
2010	2.279	2.277	2.240	2.364	2.309	2.400	2.453	2.502	2.398	2.397	2.394	2.378
2011	2.533	2.659	2.715	2.722	2.694	2.774	2.818	2.819	2.868	2.876	2.899	2.921
2012	3.005	2.947	3.016	2.998	2.995	3.007	3.085	2.991	3.024		3.175	3.080
2013	3.407	3.379	3.332	3.268	3.311	3.382	3.459	3.454	3.502	3.389	3.477	3.460
2014	3.467	3.555	3.698	3.808	3.856	3.880	3.884	4.013	4.096	4.154	4.201	4.156
2015	4.235	4.238	4.200	4.231	4.136	4.221	4.200					

Source: Bureau of Labor Statistics, <http://data.bls.gov/timeseries/APU0000703112>

- a) Find the average rate of change of the price of ground beef between January 2010 and January 2015. Give your answer in dollars per pound per year.

$$AROC = \frac{4.235 - 2.279}{2015 - 2010} \approx \$0.39 \text{ per pound per year}$$

- b) Find the average rate of change of the price of ground beef between July 2005 and July 2010. Give your answer in dollars per pound per year.

$$AROC = \frac{2.453 - 2.299}{2010 - 2005} \approx \$0.03 \text{ per pound per year}$$