Graphs in Economics

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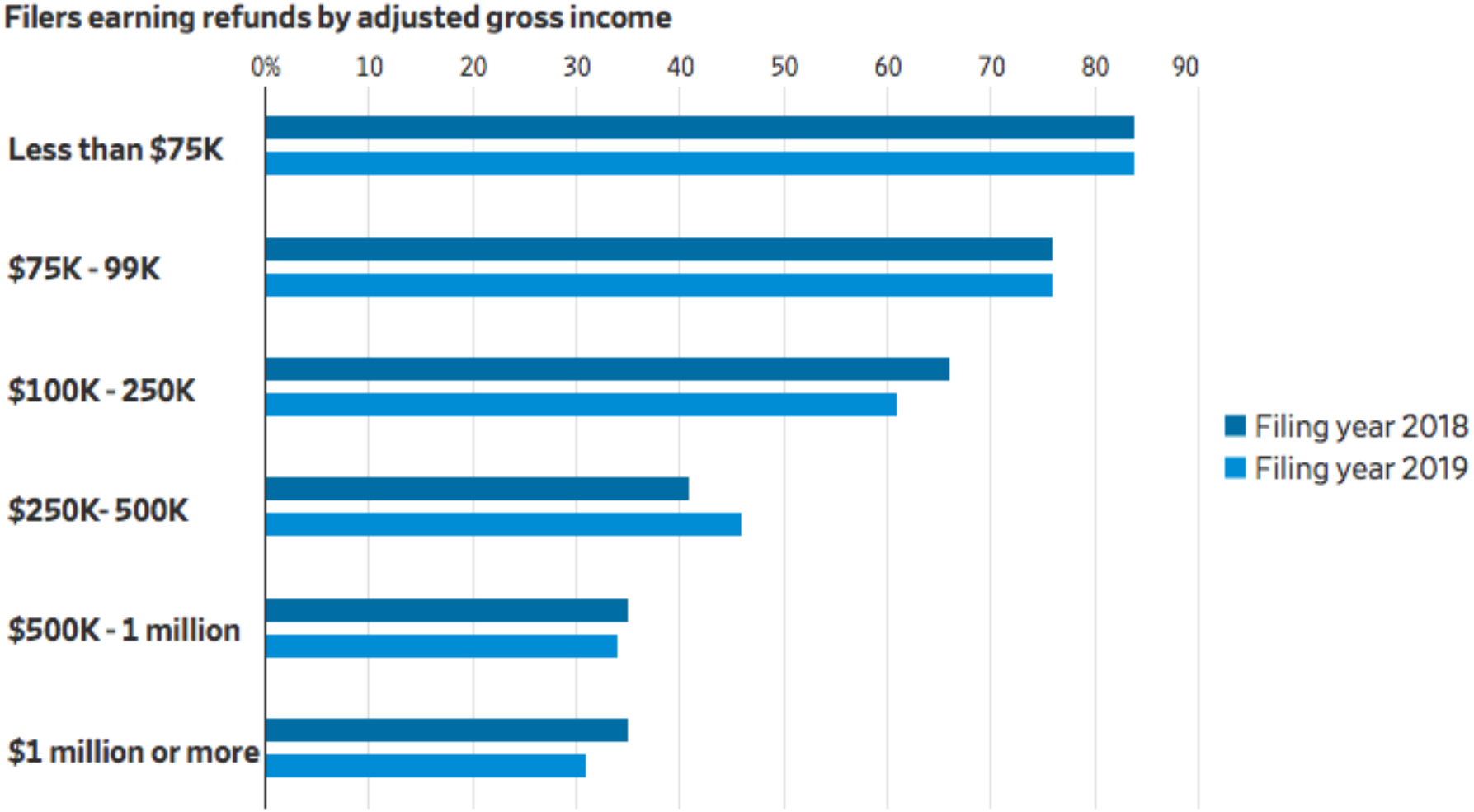
7/2/2019

Percentage With Refunds

Under the new tax law, people making $100,000 to under $250,000 were less likely to receive tax refunds.

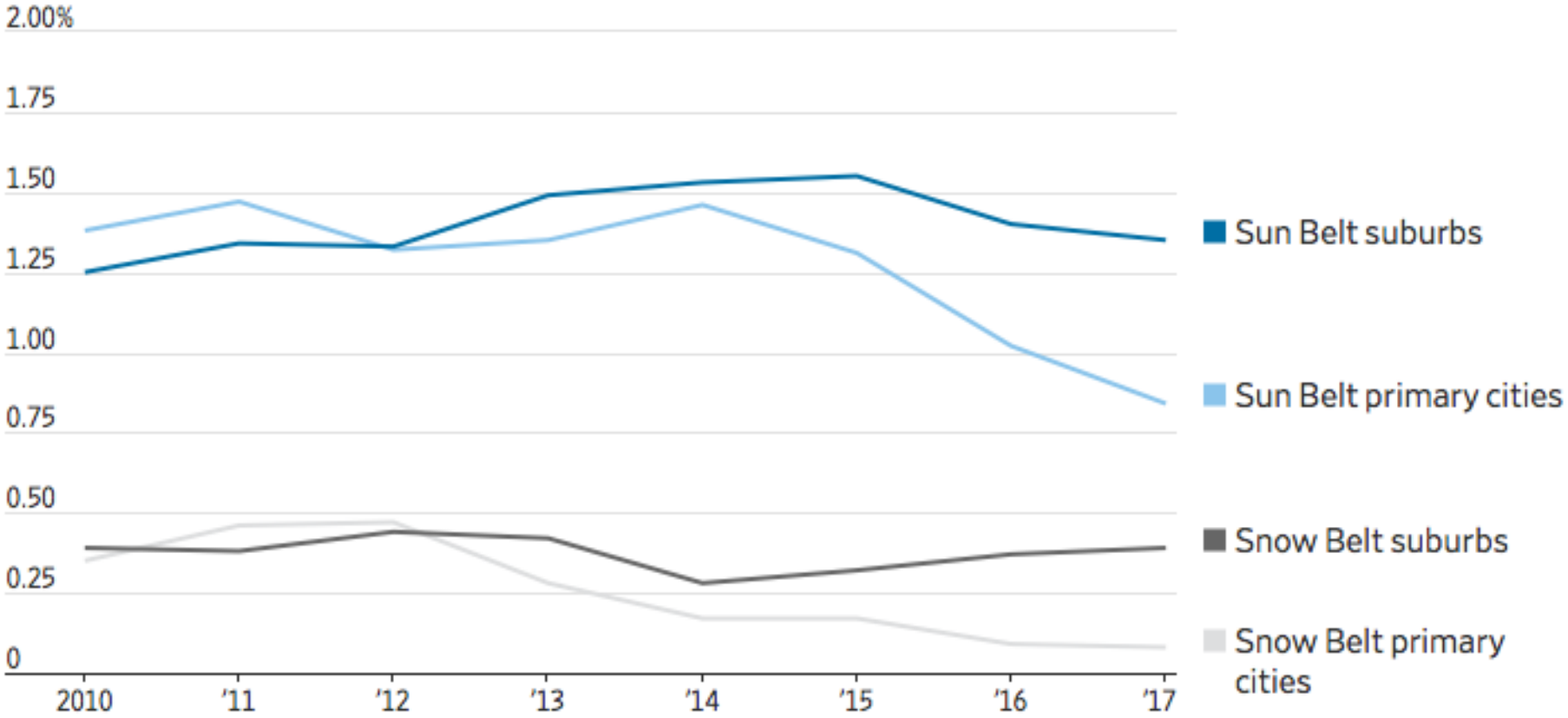


Note: Based on returns filed and processed through May 23 of each year.
Source: Internal Revenue Service

Suburbs Soar

Growth rates of suburbs are surpassing the pace of their nearby metropolitan areas.

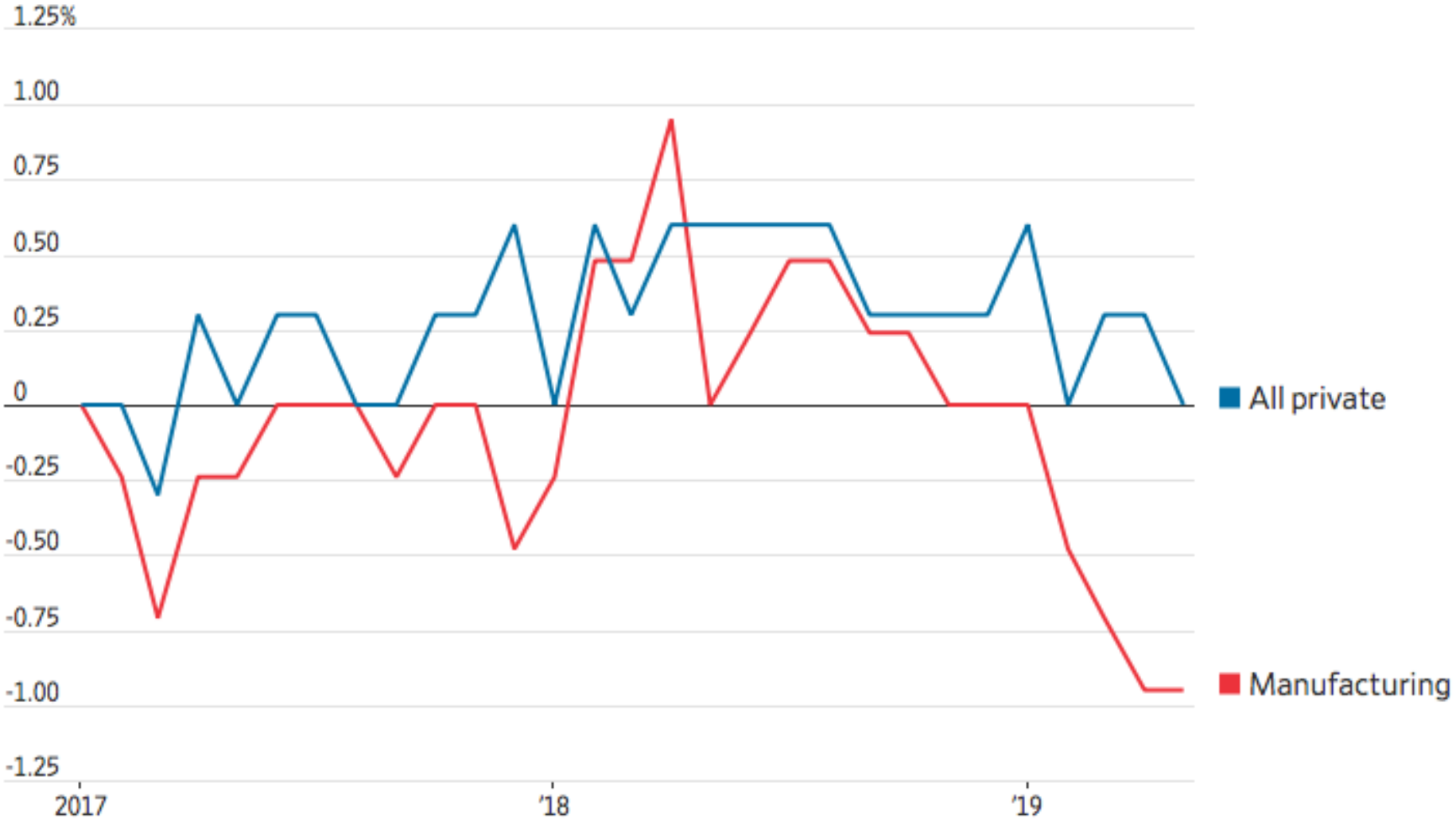
Percentage change in population for primary cities and suburbs in major metros



Notes: Sun Belt refers to states in the South and West census regions and Snow Belt refers to states in the Northeast and Midwest census regions. Data are based on metropolitan areas with populations exceeding one million. Primary cities are the largest cities and up to two additional cities exceeding 100,000 people in a metro.

Source: Brookings Institute

Average weekly hours of production and nonsupervisory employees, change since January 2017



Note: Seasonally adjusted
Source: Labor Department

Graphs, Variables, and Economic Models

- Graphs make relationships between abstract objects easier to understand.
- In the previous graph, the relationship between refunds, income, and filing year are being depicted.
- Refund, income, and filing year are **variables**, a quantity that can take on more than one value.

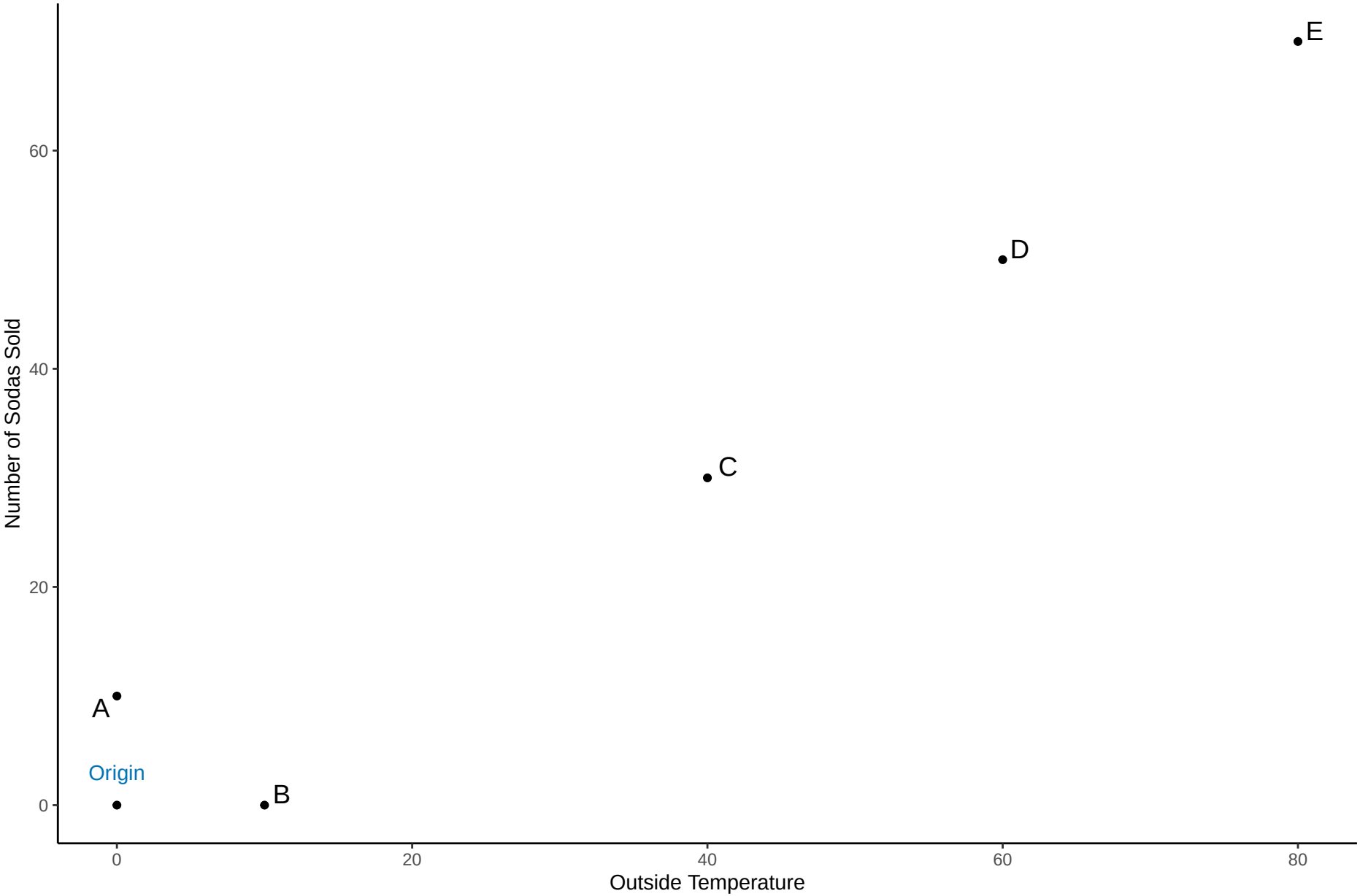
How Graphs Work

Most graphs in economics are based on a grid built around two perpendicular lines that show the values of two variables.

Two Variable Graphs

x-variable	y-variable	
Outside Temperature	Number of Sodas Sold	Point
0	10	A
10	0	B
40	30	C
60	50	D
80	70	E

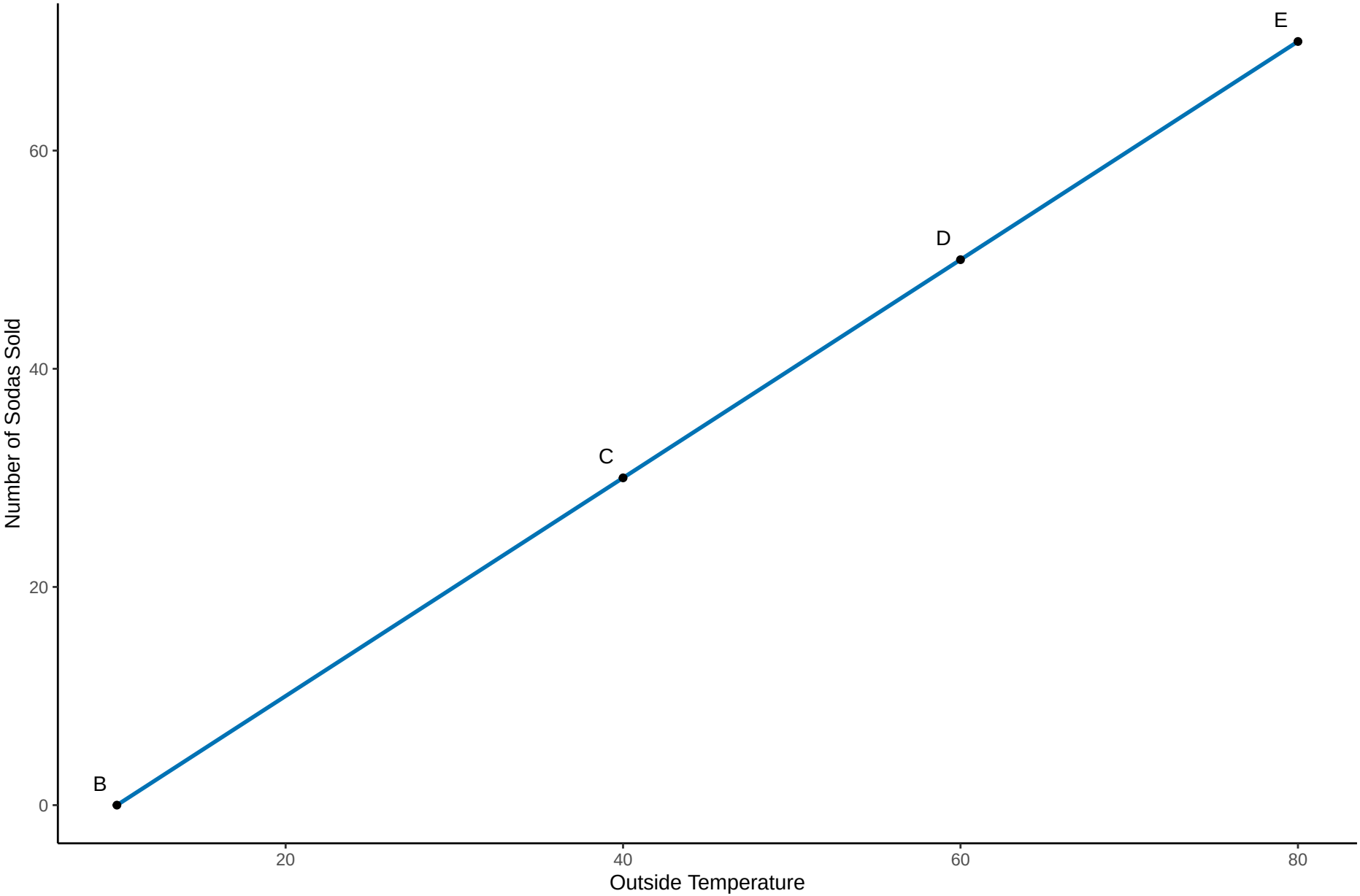
Plotting Points on a Two Variable Graph



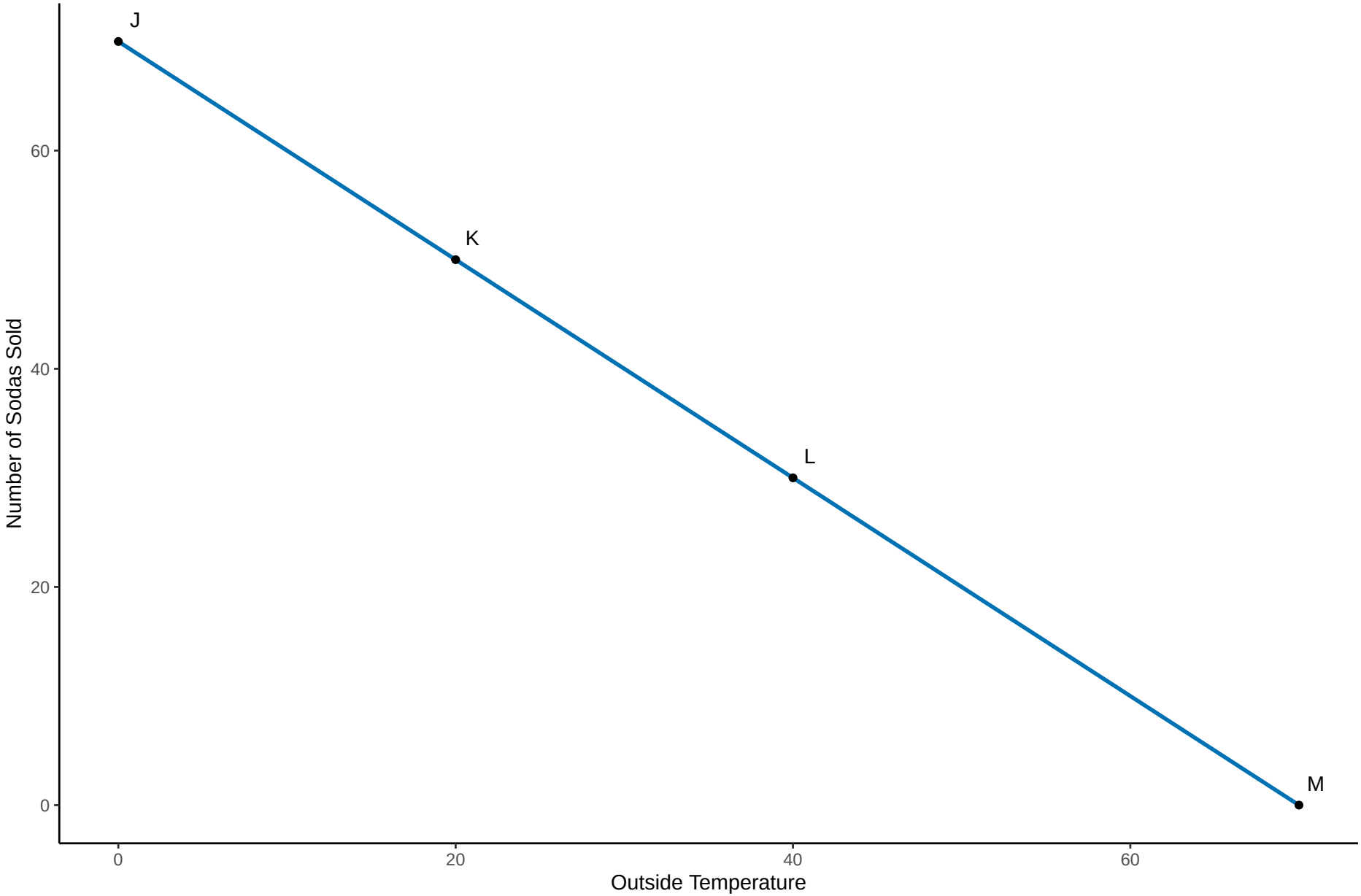
Important Terms

- A **causal relationship** depicts relationships between two variables where the **independent variable** influences the **dependendent variable**
- A **curve** is a line on a graph that depicts the relationship between two variables
- The **slope** of a line or a curve is a measure of how steep it is

Positive Linear Relationship



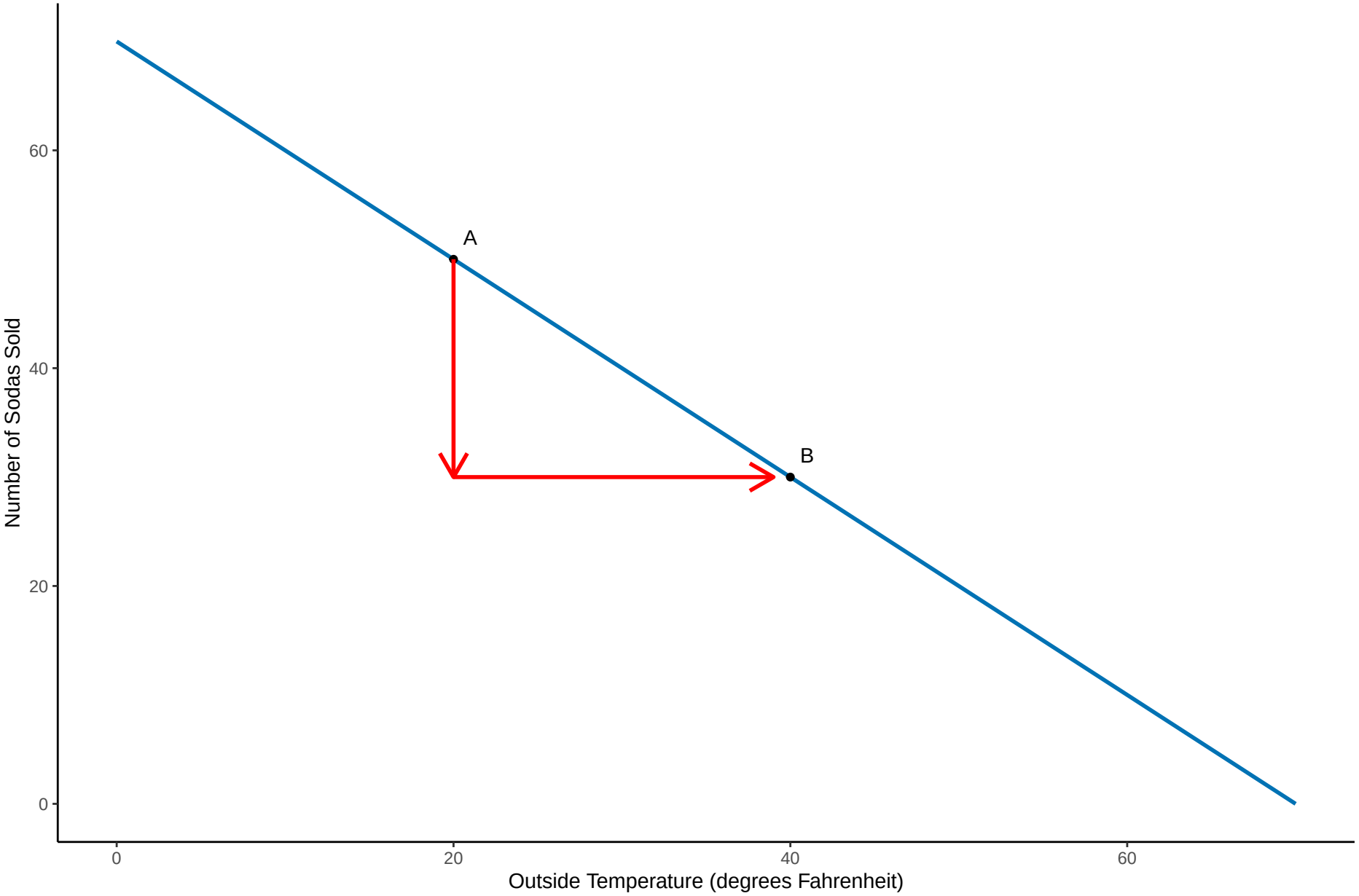
Negative Linear Relationship



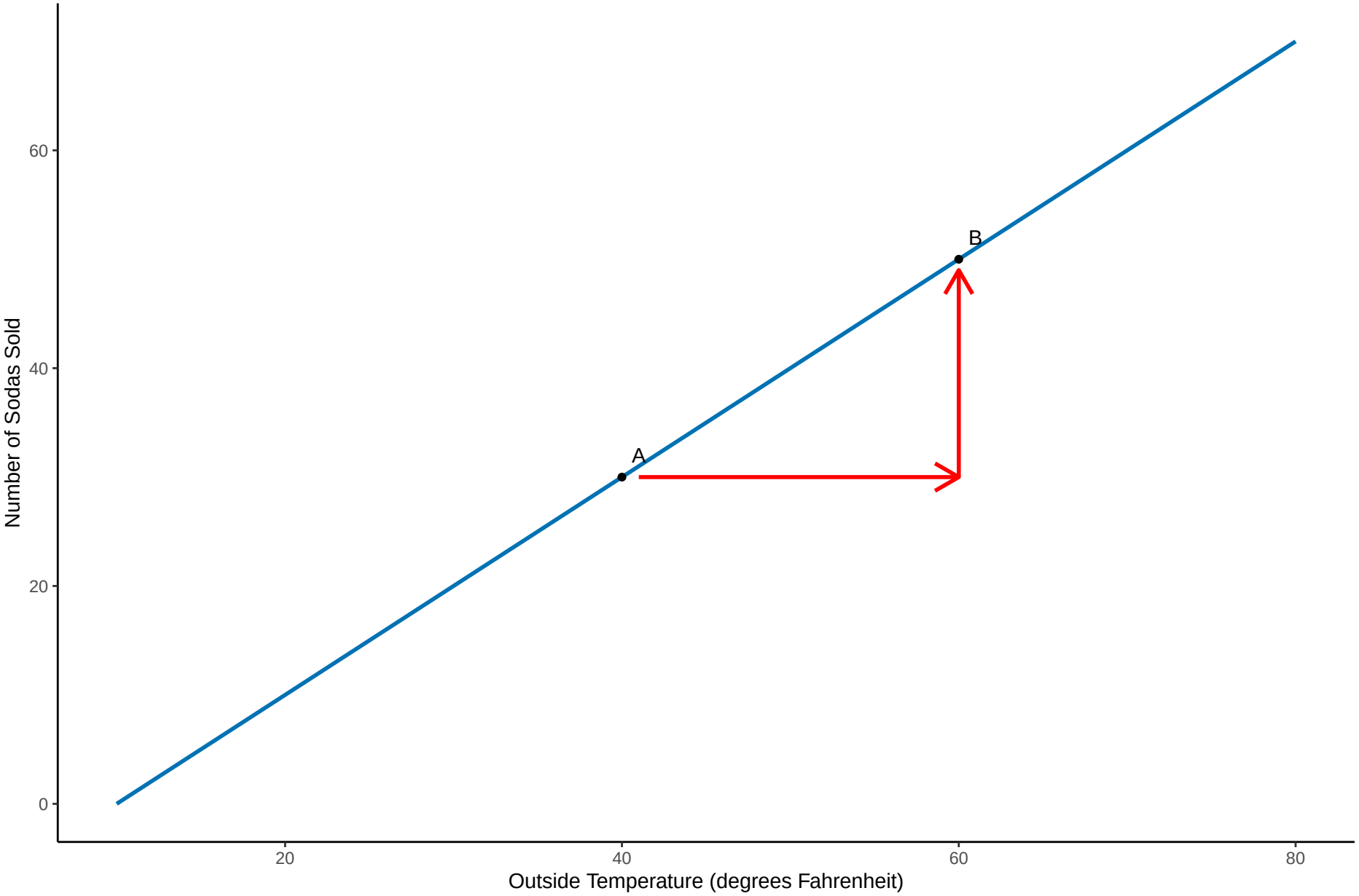
Calculating the Slope of a Line

$$\frac{\text{Change in y}}{\text{Change in x}} = \frac{\Delta y}{\Delta x} = \text{Slope}$$

Negative Constant Slope



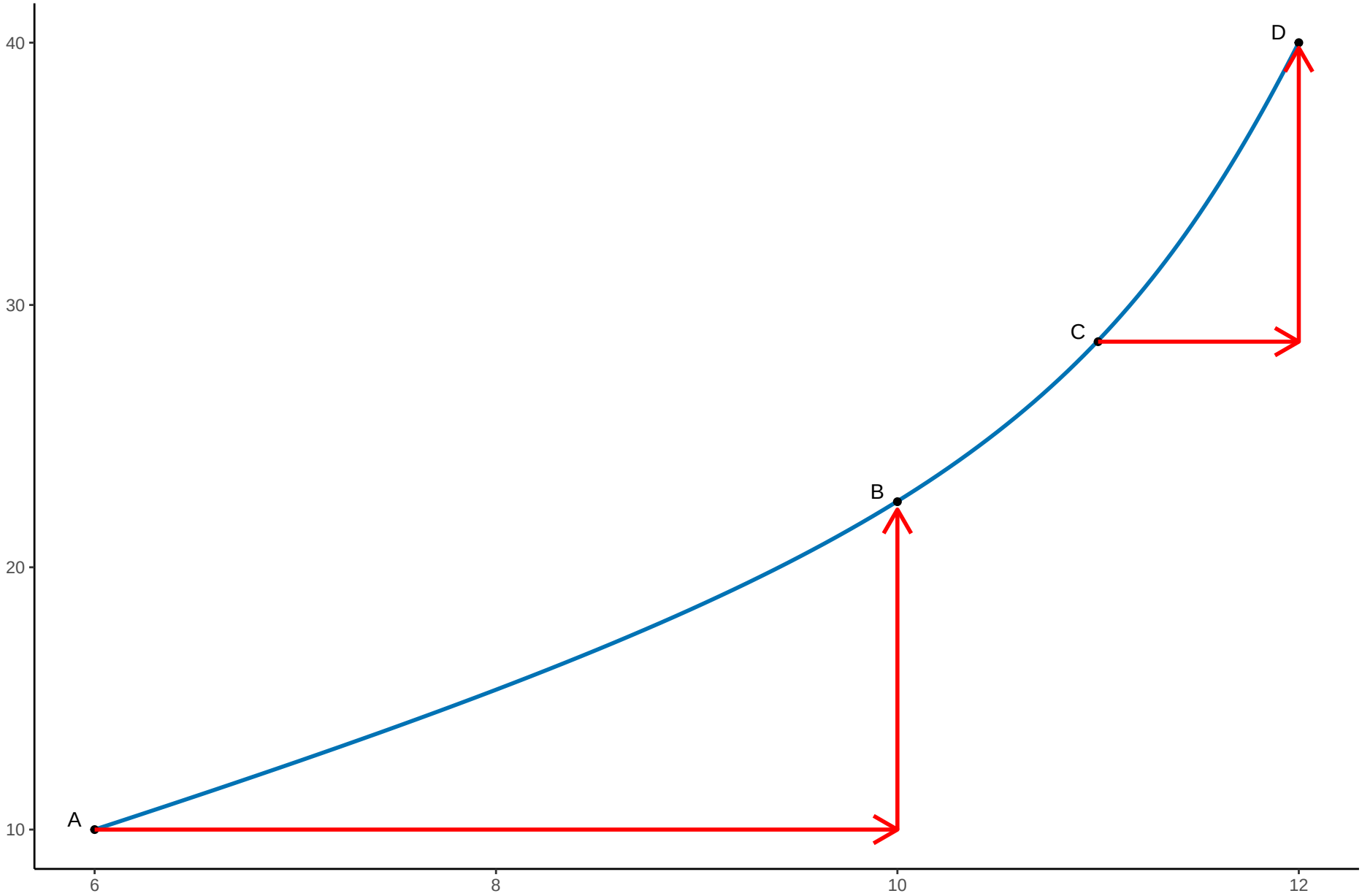
Positive Constant Slope



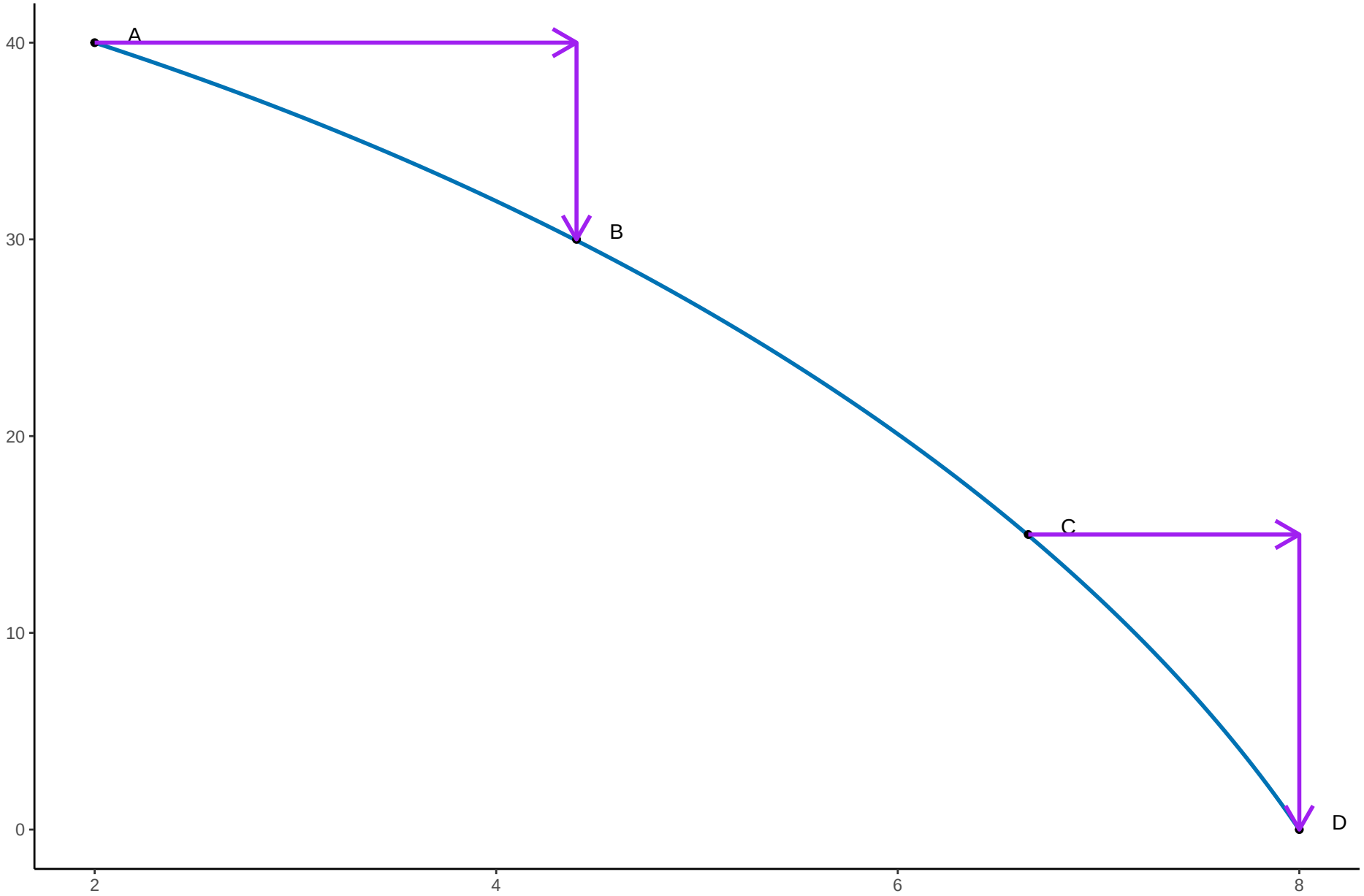
Horizontal and Vertical Curves

- Horizontal curves have **zero** slope
- Vertical curves have **infinite** slope
- In general, vertical and horizontal indicate a lack of a relationship between the variables

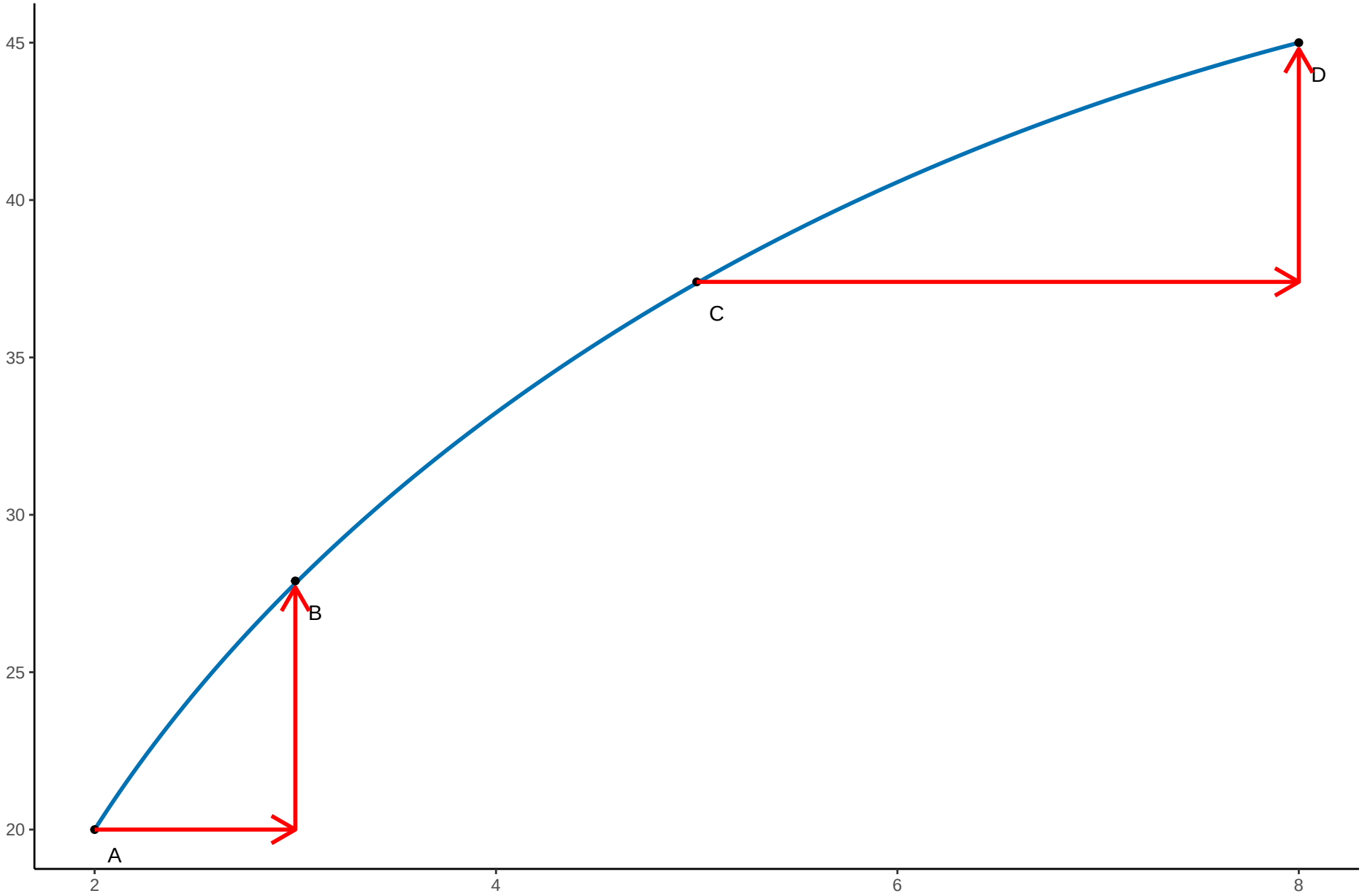
Positive Increasing Slope



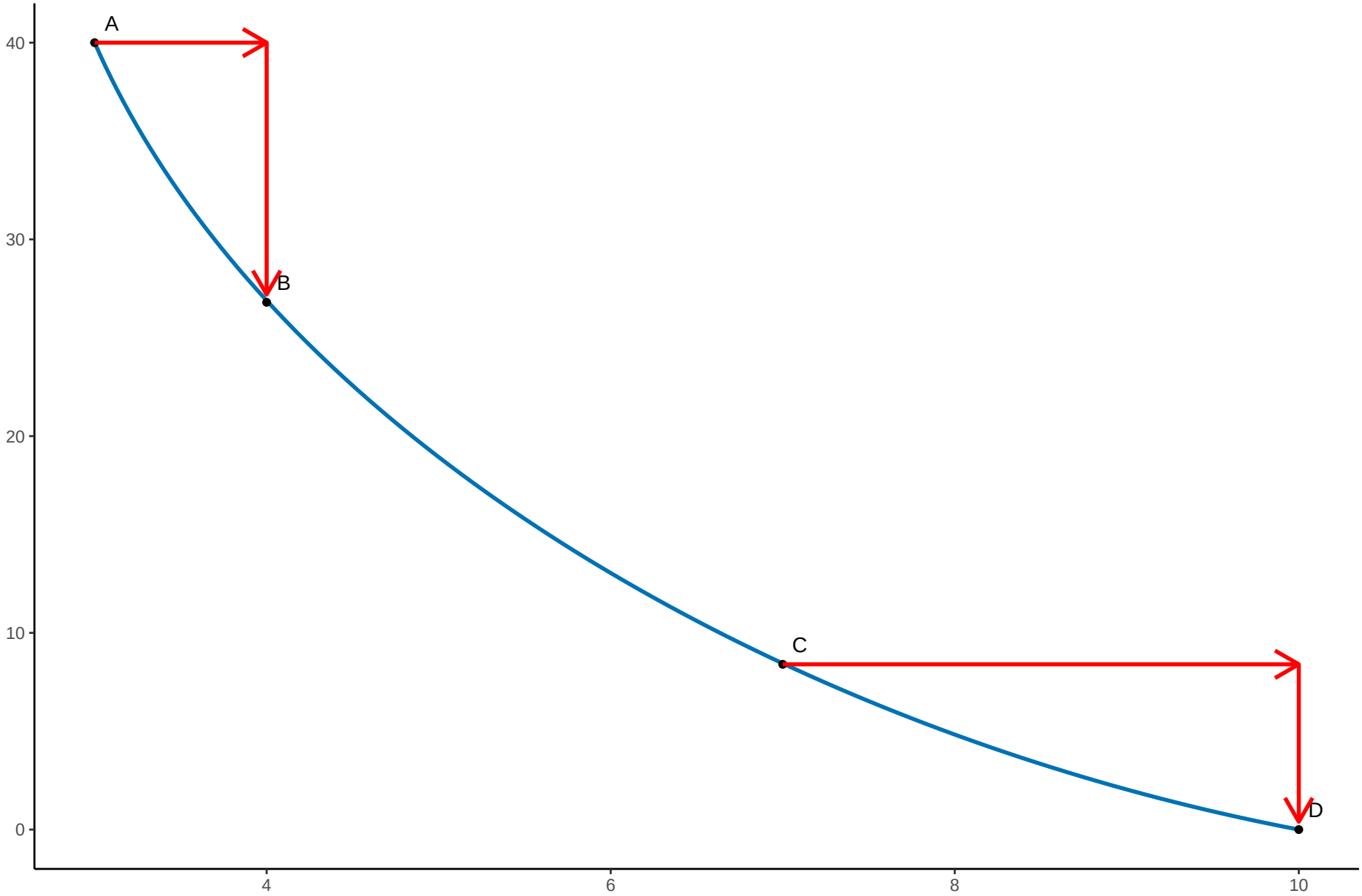
Negative Increasing Slope



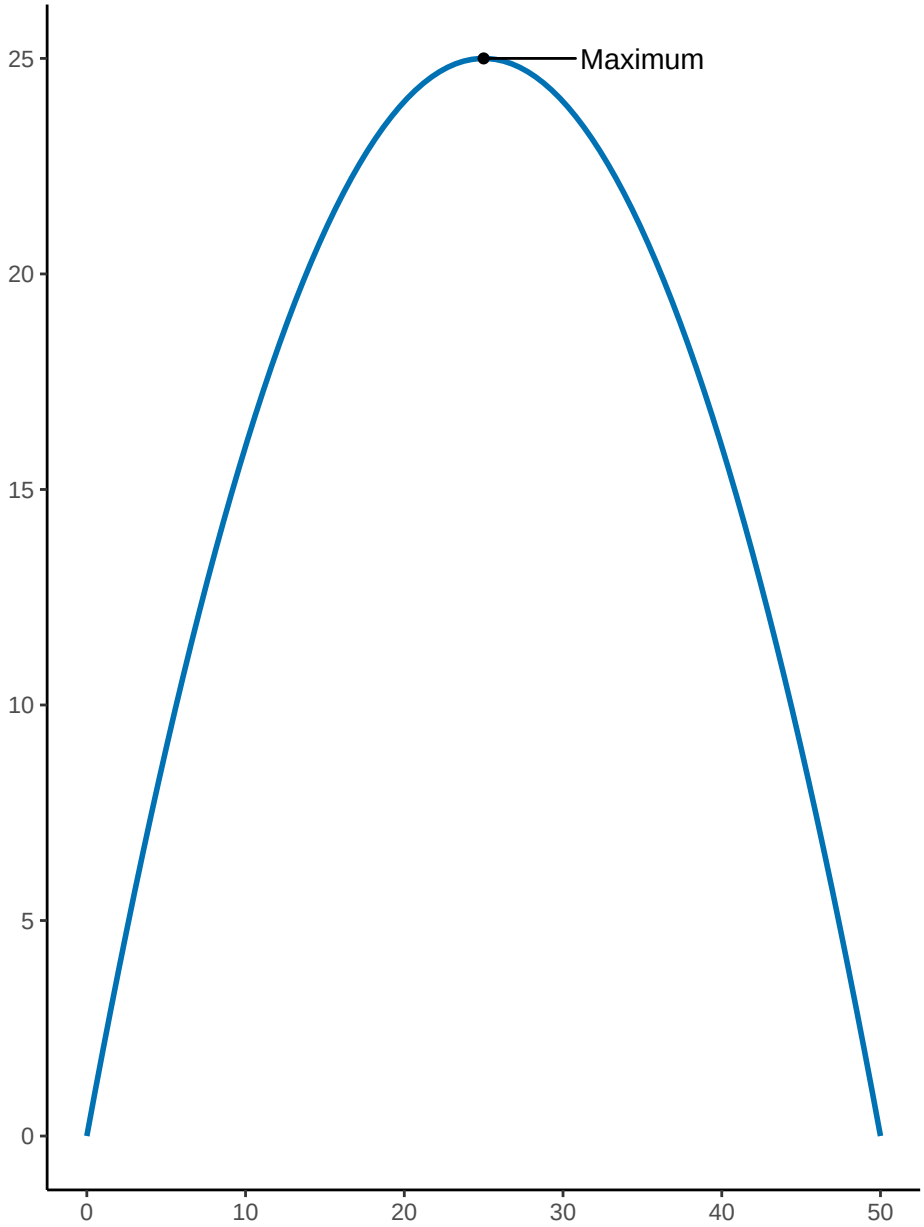
Positive Decreasing Slope



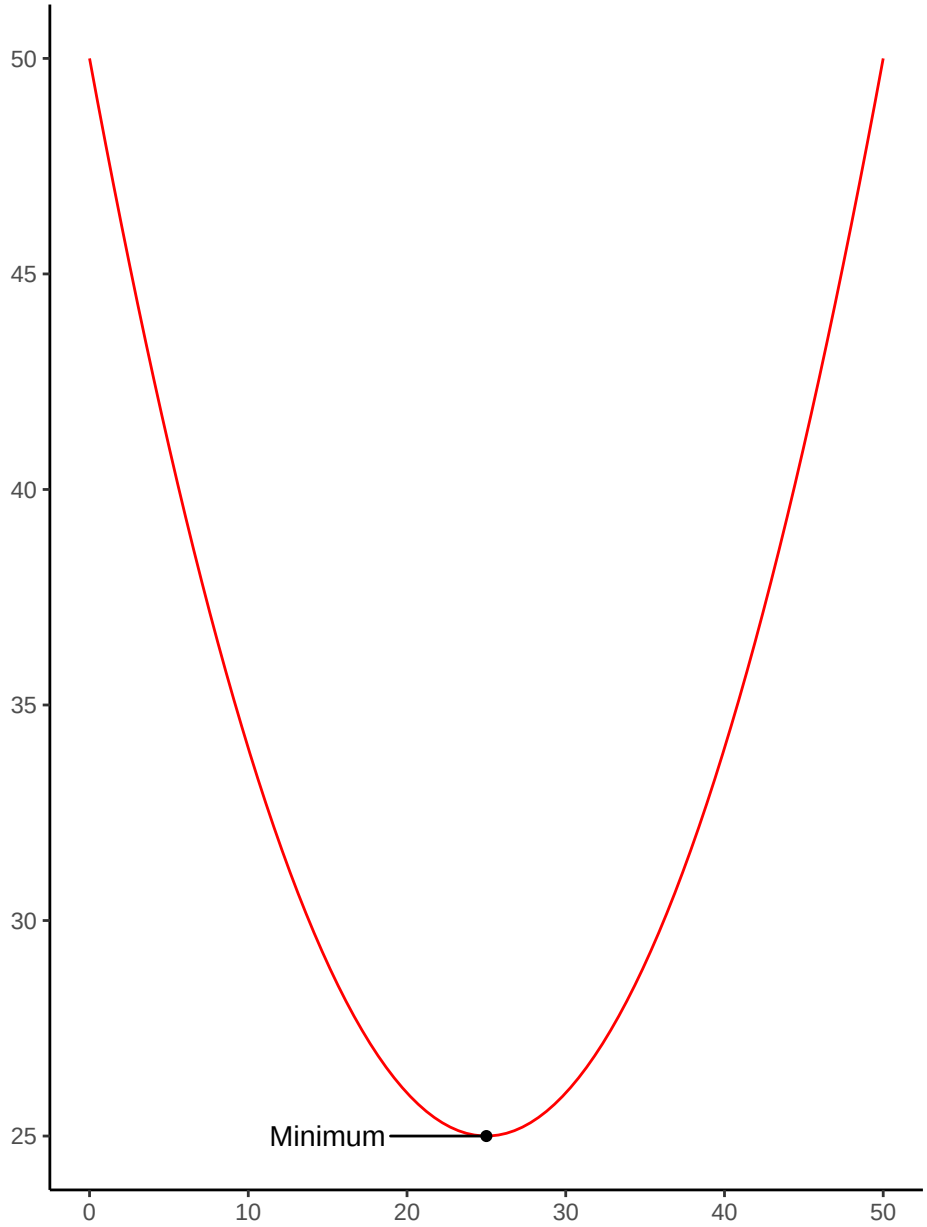
Negative Decreasing Slope



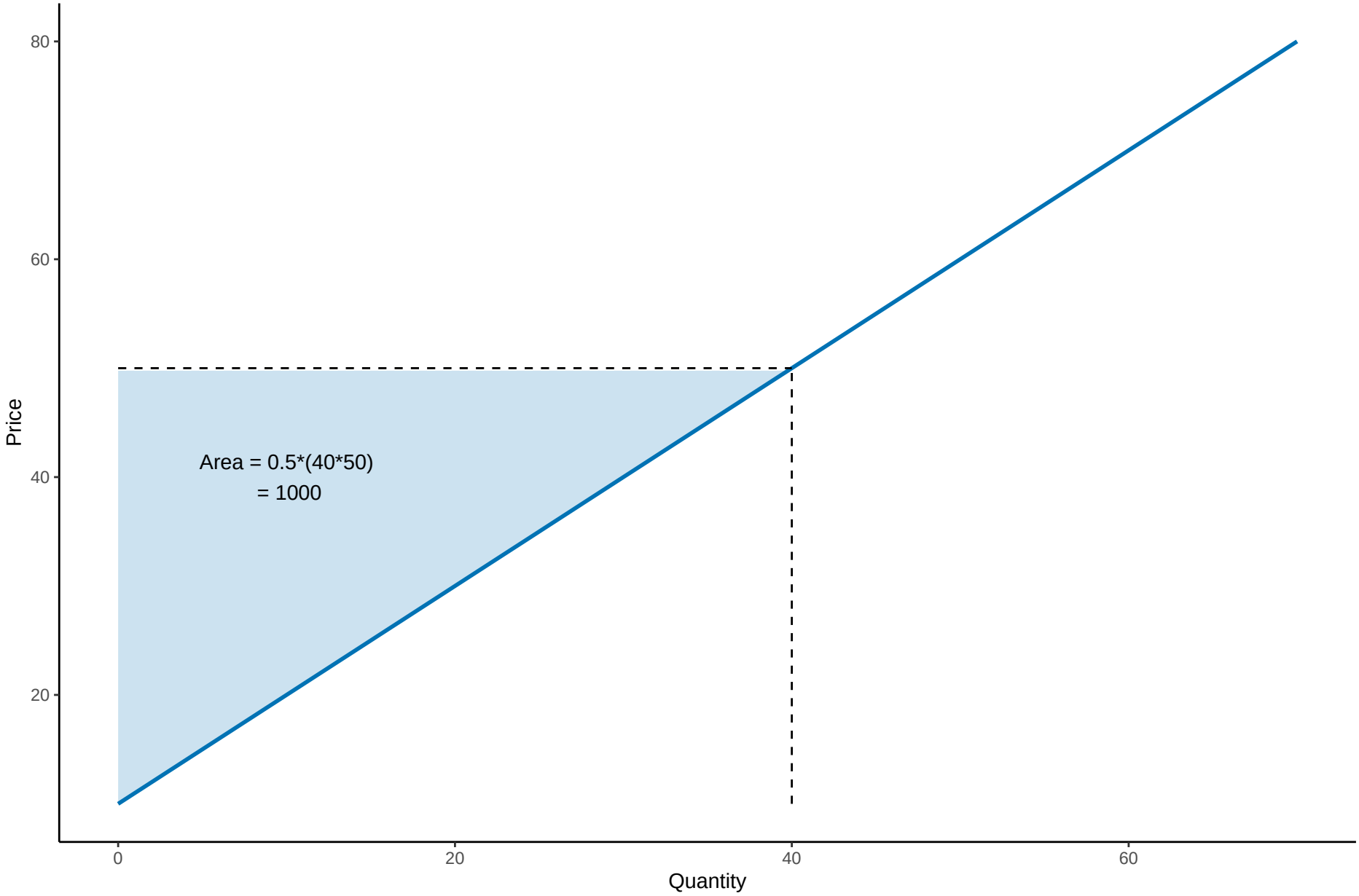
Maximum Point



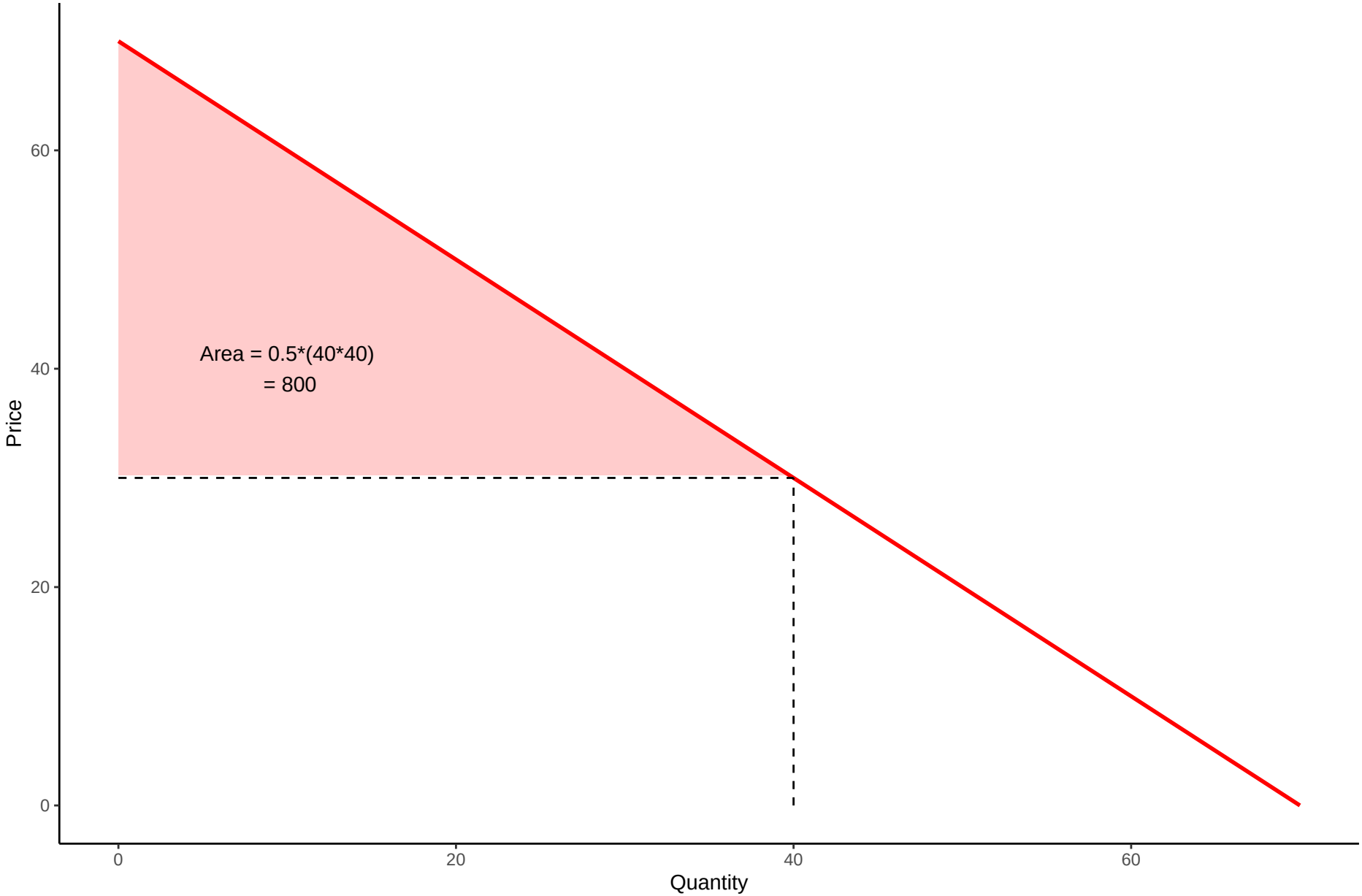
Minimum Point



Area Above a Linear Curve



Area Above a Linear Curve

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## Registered S3 method overwritten by 'xts':
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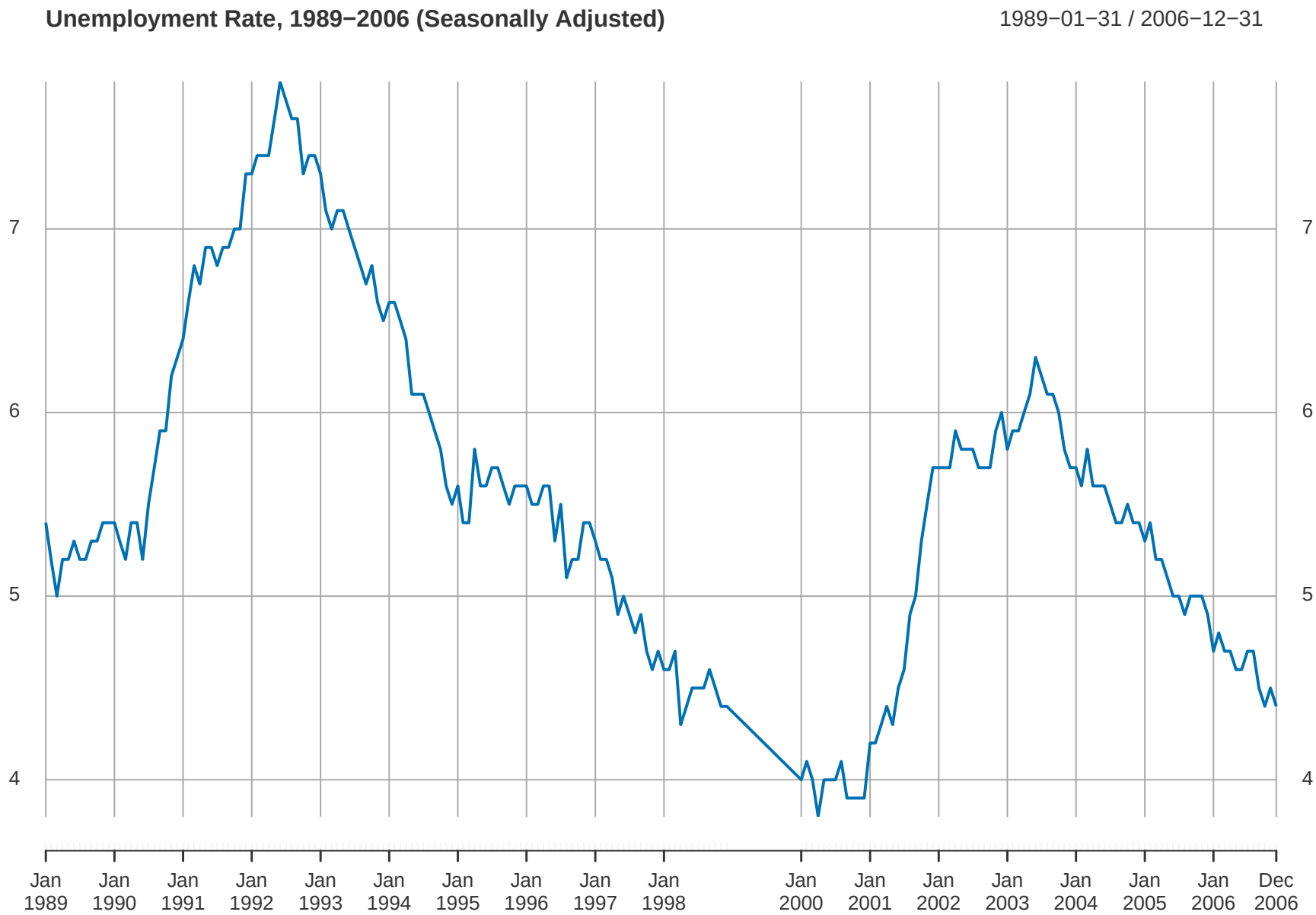
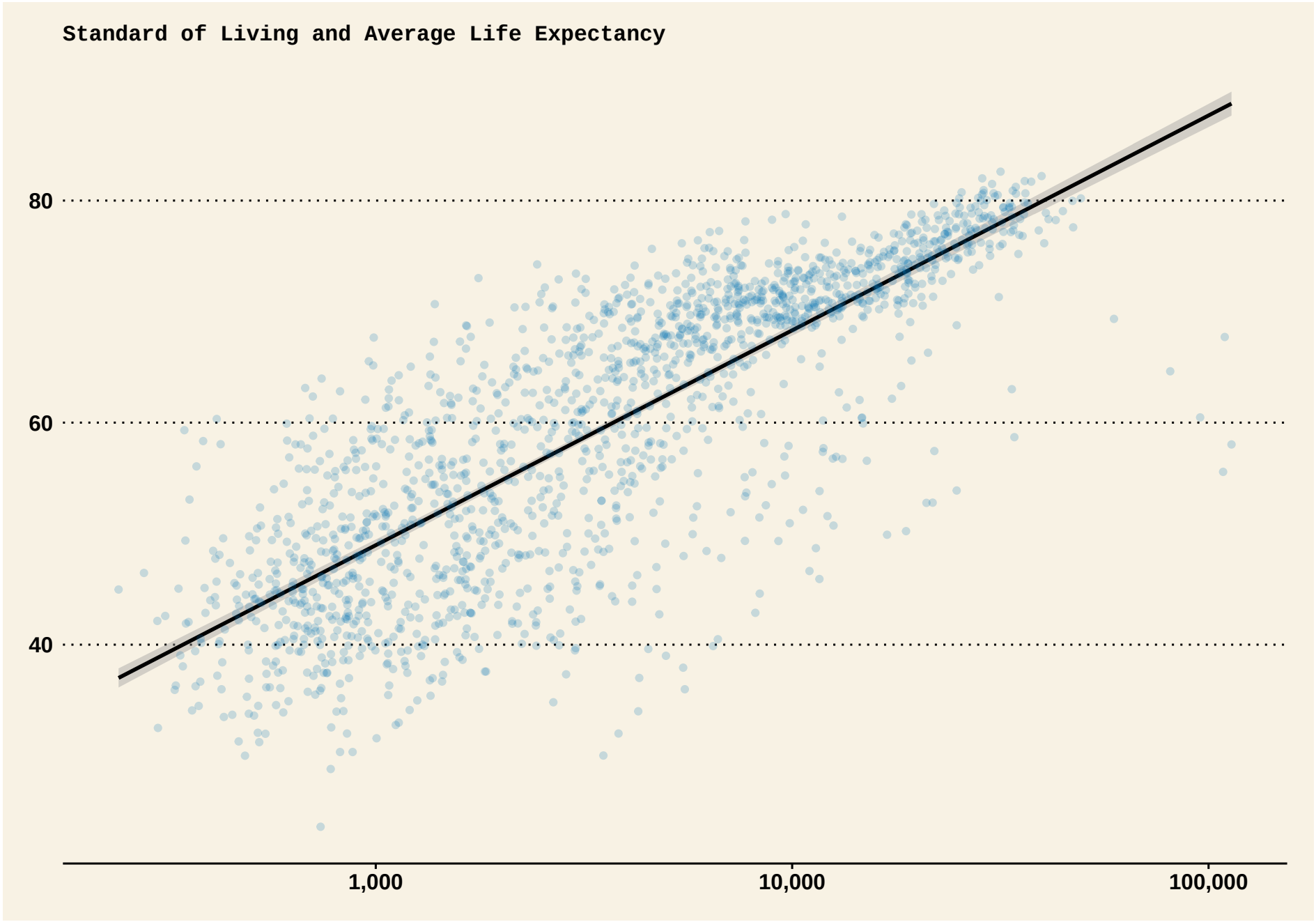
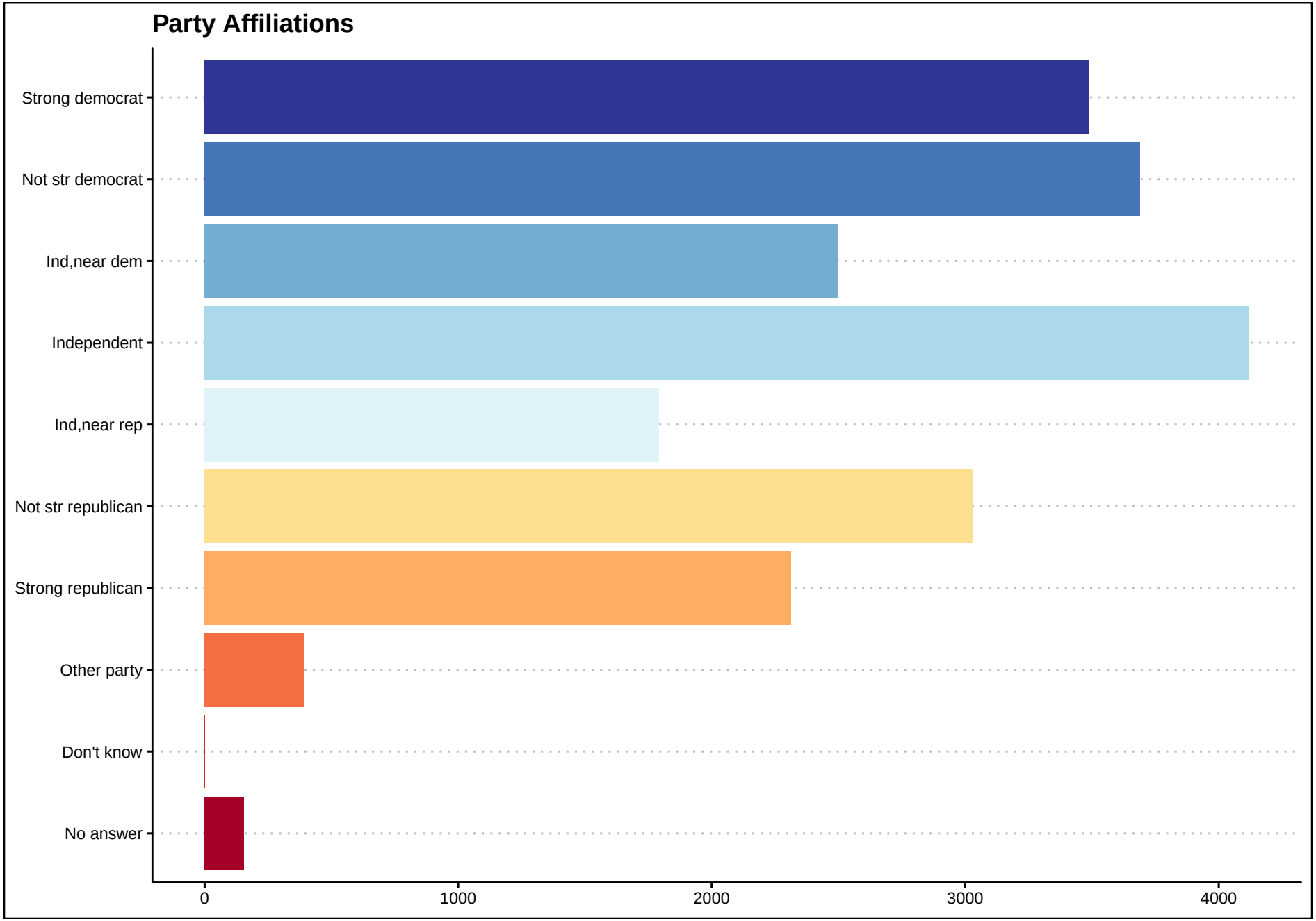
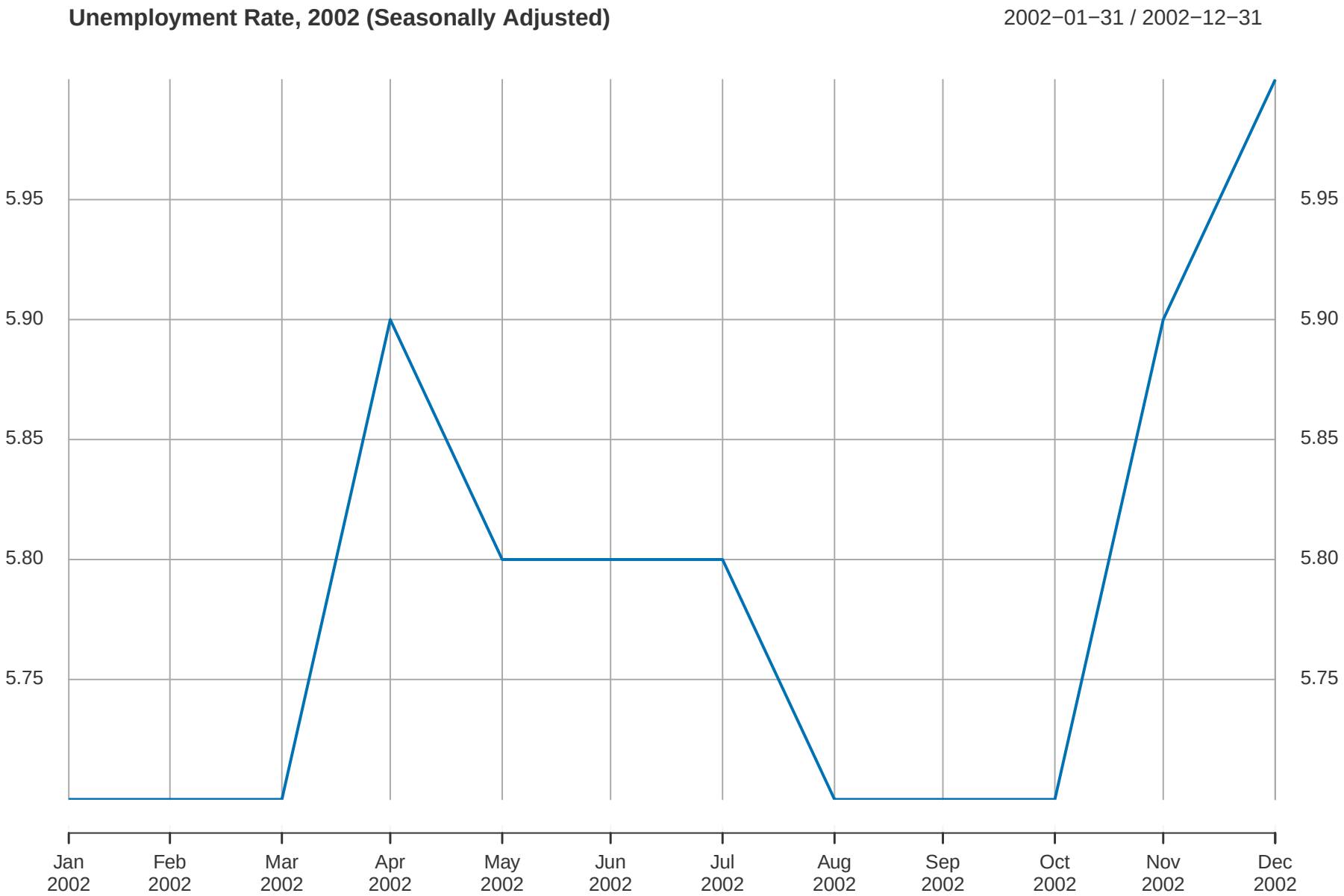

Unemployment Rate, 1989−2006 (Seasonally Adjusted)
1989−01−31 / 2006−12−31
7
6
5
4
Jan 1989
Jan 1990
Jan 1991
Jan 1992
Jan 1993
Jan 1994
Jan 1995
Jan 1996
Jan 1997
Jan 1998
Jan 2000
Jan 2001
Jan 2002
Jan 2003
Jan 2004
Jan 2005
Jan 2006
Dec 2006


Standard of Living and Average Life Expectancy
80
60
40
1,000
10,000
100,000


Party Affiliations
Strong democrat
Not str democrat
Ind,near dem
Independent
Ind,near rep
Not str republican
Strong republican
Other party
Don't know
No answer
0
1000
2000
3000
4000


Unemployment Rate, 2002 (Seasonally Adjusted)
2002−01−31 / 2002−12−31
5.95
5.90
5.85
5.80
5.75
Jan 2002
Feb 2002
Mar 2002
Apr 2002
May 2002
Jun 2002
Jul 2002
Aug 2002
Sep 2002
Oct 2002
Nov 2002
Dec 2002