

Finding Slope of a Line Practice

This practice will focus on:

- A. calculating slope with units by dividing not only the values of the rise over run of the line, but also dividing the units. (Special note: we do not use points of data for calculating slope unless they fall perfectly on the line. Just use the line)

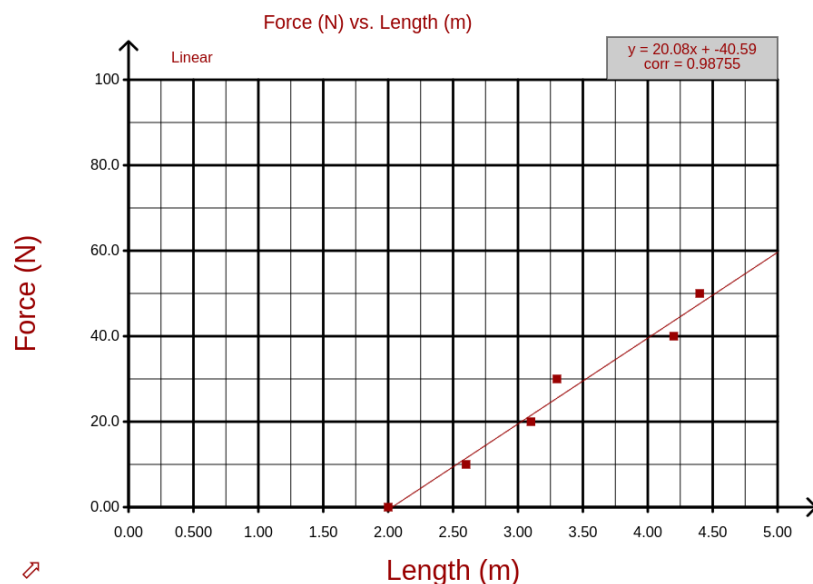
Example: the graphed line has a slope of $(60 \text{ N} - 0 \text{ N}) / (5 \text{ m} - 2 \text{ m}) = 20 \text{ N/m}$

- B. writing an expression for a best fit line for linear data using chart symbols

Example: since $y = 20.08x - 40.59$ is the line for this graph and $y = F$ and $x = L$, then $F = 20.08L + 40.59$

- C. verbally summarizing the relationship between the variables.

Example: The graphed data shows that force has positive linear variation with changes in length.

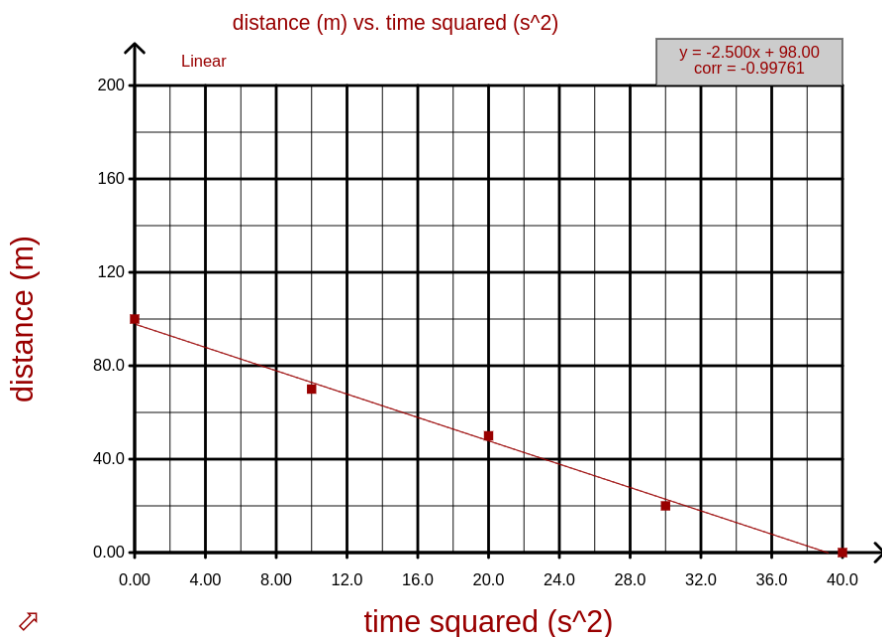


Linear regressions are provided in the upper right of each graph for you to check your slope calculation, but your slope will not be as precise as the regression, just as 20 N/m was just close, but not an exact match to 20.08 in the example above.

1. For the graph at right
 - a. Calculate (ie. show work) to find the slope with units

- b. Write an expression for the best fit line using the symbols of d for distance and t for time.

- c. Summarize the relationship between distance and time

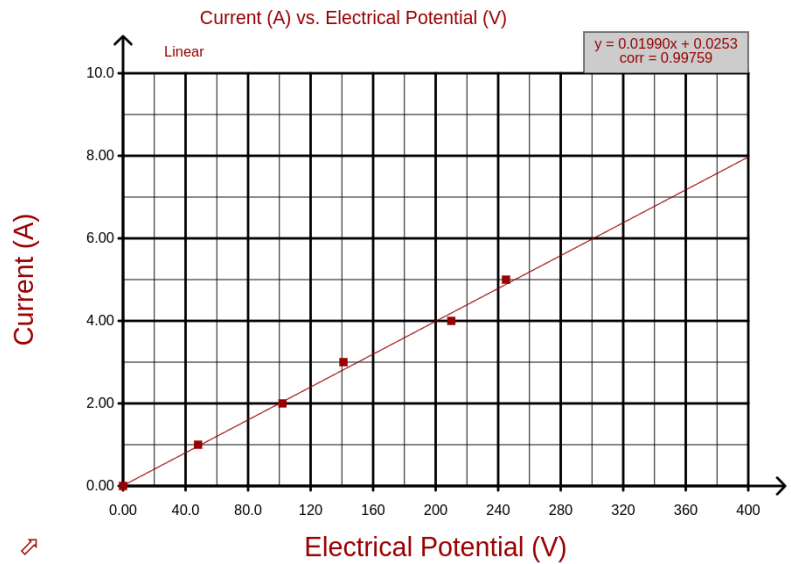


2. For the graph at right

a. Calculate (ie. show work) to find the slope with units

b. Write an expression for the best fit line using the symbols of I for current and V for potential difference.

c. Summarize the relationship between current and electrical potential.

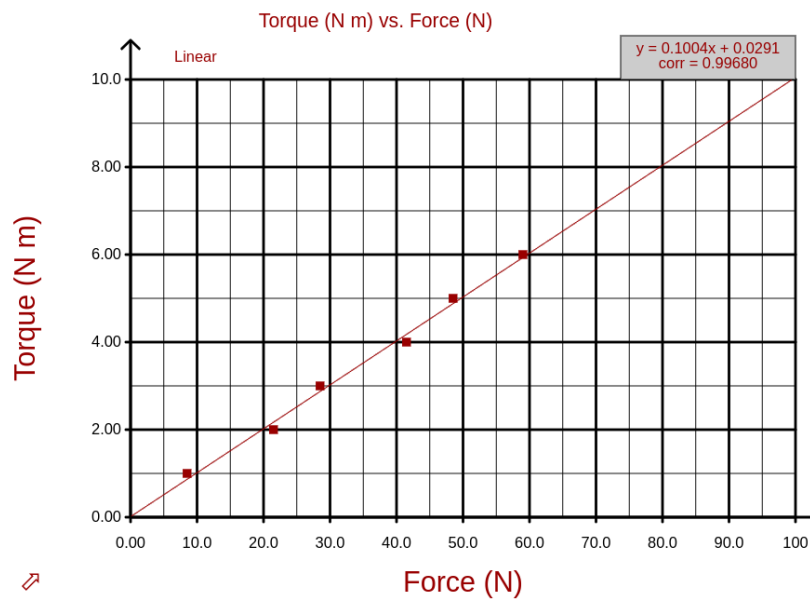


3. For the graph at right

a. Calculate (ie. show work) to find the slope with units

b. Write an expression for the best fit line using the symbols of τ for torque and F for force.

c. Summarize the relationship between torque and force.

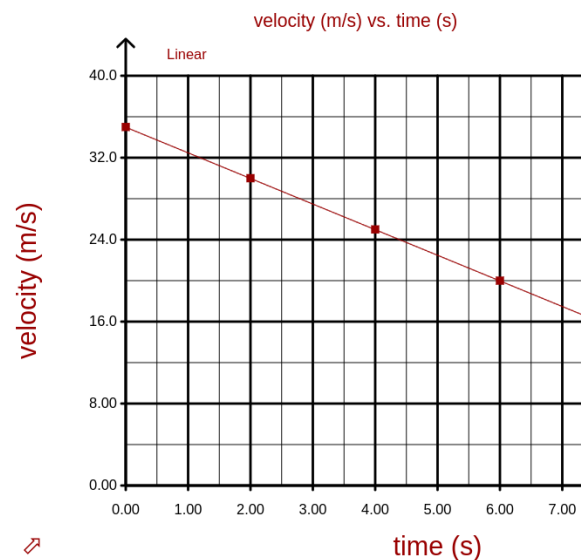


4. For the graph at right

a. Calculate (ie. show work) to find the slope with units

b. Write an expression for the best fit line using the symbols of v for velocity and t for time.

c. Summarize the relationship between velocity and time.



Example answers

1. For points (0, 100) and (39, 0) slope = -2.56 m/s^2
b) $d = (-2.56 \text{ m/s}^2) t^2$
c) the graph shows that distance has a negative linear relationship with time squared for this data set.
2. Using points (0,0) and (400, 8) slope = $.02 \text{ A/V}$,
b) $I = (.02 \text{ A/V}) V$
c) the graph shows that current is directly proportional to voltage for this data set.
3. Using (0,0) and (40, 4) slope = 0.1 Nm/N , or 0.1 m
b) $T = (0.1 \text{ m}) F$
c) the graph shows that Torque is directly proportional to force for this data set
4. For points (2,30) and (6, 20) slope = -2.5 m/s/s or -2.5 m/s^2
b) $v = (-2.5 \text{ m/s}^2) t$
c) the graph shows that velocity (or speed) is directly related to the time for this data set