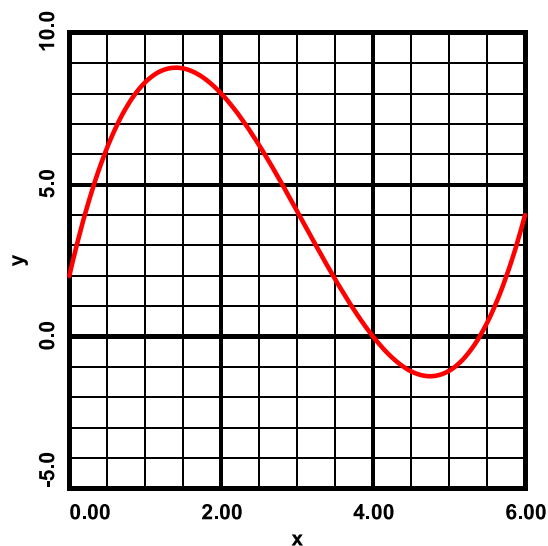


PRE-AP ALGEBRA 2

HOMEWORK #1B

Lesson 1B.1:

- 1) For $f(x) = x^2 - 12x + 39$, calculate the average rate of change of f with respect to x over the interval $5 \leq x \leq 8$.
- 2) For $y = f(x)$ defined by the graph, calculate the average rate of change of f with respect to x over the interval $2 \leq x \leq 6$.



- 3) The table below gives the distance d , in feet, as a function of time t , in seconds, for a car which completes an 8-second, 0.25-mile (1320 feet) drag race.

t	d
0	0.0
2	95.9
4	365.7
6	782.6
8	1320.0

- a) Calculate the average rate of change of d with respect to time t over the intervals in both ft/sec and mi/hr. Recall that 1 mi = 5280 ft and 1 hr = 3600 sec.
- i) $0 \leq t \leq 2$ sec
 - ii) $2 \leq t \leq 4$ sec
 - iii) $4 \leq t \leq 6$ sec
 - iv) $6 \leq t \leq 8$ sec
- b) What is the physical meaning of these rates of change?

Lesson 1B.2:

- 4) This problem shows that the slope of an exponential curve is another exponential function.

- a) Complete the table below for $y = 2^x$.

x	$y = 2^x$
0	
2	
4	
6	
8	

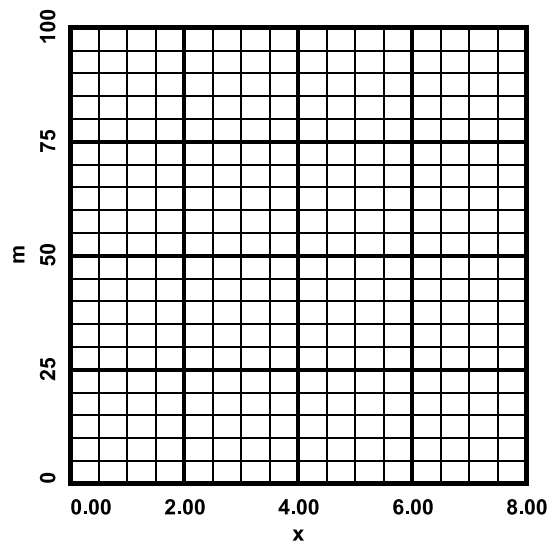
- b) Calculate the average rate of change $m = \frac{\Delta y}{\Delta x}$ for the intervals

- i) $0 \leq x \leq 2 \Rightarrow m(1)$
- ii) $2 \leq x \leq 4 \Rightarrow m(3)$
- iii) $4 \leq x \leq 6 \Rightarrow m(5)$
- iv) $6 \leq x \leq 8 \Rightarrow m(7)$

- c) Fill in the table with the slopes from part b.

x	m
1	
3	
5	
7	

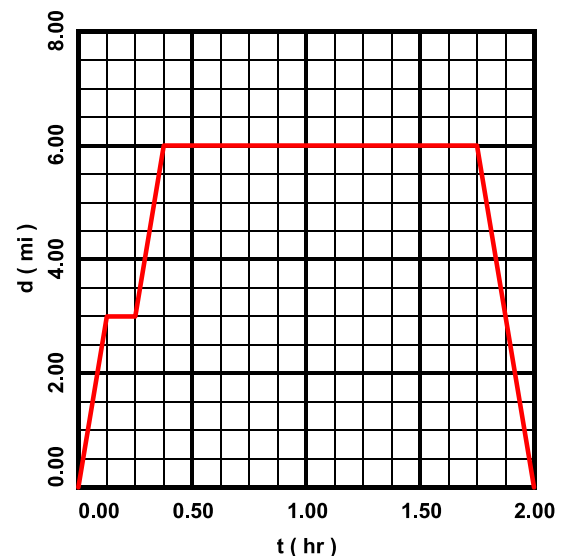
- d) Graph the points from part c on the grid below.



- e) Calculate the exponential regression equation using the points from part c. What is the meaning of the r^2 -value?
- f) Graph the regression equation from part e on the grid in part d.

Lesson 1B.3:

- 5) As depicted by the graph, Suzie rides her new motor scooter from her house down Main St. for 3 miles to the 7-11, where she buys a bag of Flaming Hot Cheetos. She then continues down Main St. to Frank's house, where they visit, and she shows him her motor scooter. After the visit, she returns back down Main St. to her house on her motor scooter. The graph shows the distance d from Suzie's house, in miles, as a function of time t , in hours.



- a) What was Suzie's velocity while she is driving to the 7-11?
- b) For how long, in minutes, was she at the 7-11?
- c) Calculate the average rate of change of d with respect to t over the time interval $0 \leq t \leq \frac{3}{8}$ hours.
- d) For how long, in minutes, was Suzie at Frank's house?
- e) What was Suzie's velocity when she drove back home? What is the meaning of the negative value?

PRE-AP ALGEBRA 2

HOMEWORK #1B

- 6) In 1965, 40.0% of U.S. adults smoked cigarettes daily. In 2021, 11.5% of adults smoked cigarettes daily.

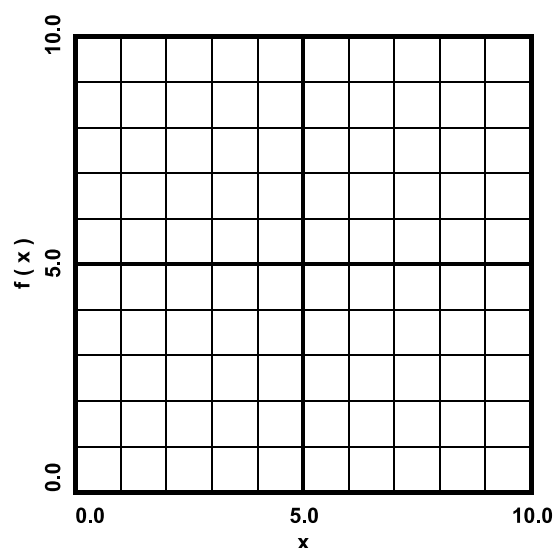
- a) Calculate the average rate of change of the percent of adults who smoked with respect to time over that time period.
- b) Assuming that the rate of change from part **a** always holds, estimate:
 - i) The percentage of adults who will smoke in 2030.
 - ii) In what year will the percentage of adult smokers be 5.0%?

Lesson 1B.4:

- 7) Graph

$$f(x) = \begin{cases} \frac{2}{3}x + 4 & , \quad x \leq 3 \\ \frac{1}{4}x^2 - \frac{5}{2}x + \frac{45}{4} & , \quad 3 < x \leq 7 \\ -\frac{2}{3}x + \frac{32}{3} & , \quad x > 7 \end{cases}$$

on the grid below.



- 8) For

$$f(x) = \begin{cases} x^2 & , \quad x \leq 2 \\ 8 - x & , \quad 2 < x \leq 5 \\ \frac{1}{32} \cdot 2^x & , \quad x > 5 \end{cases}$$

- a) Calculate $f(1)$, $f(2)$, $f(5)$ and $f(8)$.
- b) Calculate the average rate of change of f with respect to x over the interval $2 \leq x \leq 8$.

Lesson 1B.5:

- 9) Convert the parabolas in standard form to vertex form by completing the square.

a) $y = -x^2 + 8x - 18$

b) $y = 4x^2 + 24x + 39$

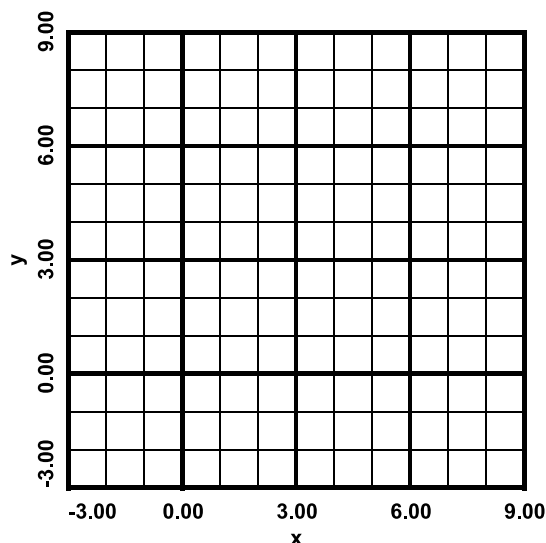
- 10) Solve the quadratic equations for x by completing the square.

a) $x^2 + 3x - 18 = 0$

b) $8x^2 + 22x - 21 = 0$

Lesson 1B.6:

- 11) Graph $y - 3 = 2|x - 3|$ on the grid below.



- 12) By looking at the graph in problem 11, convert $y - 3 = 2|x - 3|$ into a piecewise-defined function with no absolute values.

- 13)** Algebraically convert $y - 1 = 3|x - 3|$ into a piecewise-defined function with no absolute values.

- 14)** Convert

$$y = \begin{cases} -4x + 17 & , \quad x \leq 5 \\ 4x - 23 & , \quad x > 5 \end{cases}$$

into an absolute value function.