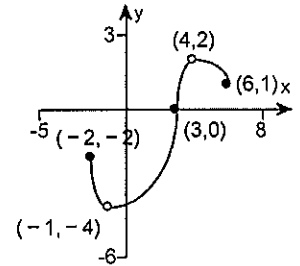


Student: _____	Instructor: Joe Betters
Date: _____	Course: Pre-Calculus Pre AP (Master Course) Assignment: 2.3-2.4 Classwork

1. For the graph of a function $y = f(x)$ shown to the right, find the absolute maximum and the absolute minimum, if it exists.



Select the correct answer below and, if necessary, fill in the answer box within your choice.

- A. The absolute maximum of $y = f(x)$ is _____.
(Type an integer or a simplified fraction.)
- B. There is no absolute maximum for $y = f(x)$.

Select the correct answer below and, if necessary, fill in the answer box within your choice.

- A. The absolute minimum of $y = f(x)$ is _____.
(Type an integer or a simplified fraction.)
- B. There is no absolute minimum for $y = f(x)$.

2. The average cost per hour in dollars of producing x riding lawn mowers is given by the following.

$$\bar{C}(x) = 0.6x^2 + 19x - 262 + \frac{2700}{x}$$

- (a) Use a graphing utility to determine the number of riding lawn mowers to produce in order to minimize average cost.
- (b) What is the minimum average cost?

(a) The average cost is minimized when approximately _____ lawn mowers are produced per hour.
(Round to the nearest whole number as needed.)

(b) The minimum average cost is approximately \$ _____ per mower.
(Round to the nearest cent as needed.)

3. For the function $f(x) = x^2$, compute the following average rates of change.

- (a) From 8 to 9
- (b) From 8 to 8.5
- (c) From 8 to 8.1
- (d) From 8 to 8.01
- (e) From 8 to 8.001

(f) Use a graphing utility to graph each of the secant lines along with f . What do you think is happening to the secant lines?

(g) To what number are the slopes of the secant lines getting closer?

(a) The average rate of change of f from $x = 8$ to $x = 9$ is

_____.
(Type an integer or a decimal.)

(b) The average rate of change of f from $x = 8$ to $x = 8.5$ is

_____.
(Type an integer or a decimal.)

(c) The average rate of change of f from $x = 8$ to $x = 8.1$ is

_____.
(Type an integer or a decimal.)

(d) The average rate of change of f from $x = 8$ to $x = 8.01$ is

_____.
(Type an integer or a decimal.)

(e) The average rate of change of f from $x = 8$ to $x = 8.001$ is _____.

(Type an integer or a decimal.)

(f) Which statement best describes what is happening to the secant lines?

- A. The slopes of the secant lines are getting smaller and smaller and the secant lines are beginning to look more and more like the graph of f at the point where $x = 8$.
- B. The slopes of the secant lines are getting smaller and smaller and the secant lines are beginning to look more and more like the tangent line to the graph of f at the point where $x = 8$.

(g) The slopes of the secant lines are approaching

_____.
(Type an integer.)

4. A telephone company offers a monthly cellular phone plan for \$24.99. It includes 300 anytime minutes plus \$0.25 per minute for additional minutes. The following function is used to compute the monthly cost for a subscriber, where x is the number of anytime minutes used.

$$C(x) = \begin{cases} 24.99 & \text{if } 0 < x \leq 300 \\ 0.25x - 50.01 & \text{if } x > 300 \end{cases}$$

Compute the monthly cost of the cellular phone for use of the following anytime minutes.

(a) 175

(b) 350

(c) 301

(a) $C(175) = \$$ _____ (Round to the nearest cent as needed.)

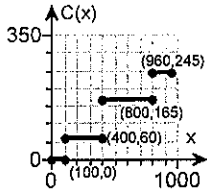
(b) $C(350) = \$$ _____ (Round to the nearest cent as needed.)

(c) $C(301) = \$$ _____ (Round to the nearest cent as needed.)

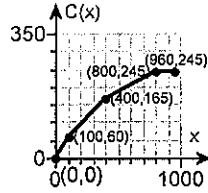
5. A trucking company transports goods between two cities that are 960 miles apart. The company charges, for each pound, \$0.60 per mile for the first 100 miles, \$0.35 per mile for the next 300 miles, \$0.20 per mile for the next 400 miles, and no charge for the remaining 160 miles.
- (a) Graph the relationship between the cost of transportation in dollars $C(x)$ and mileage x over the entire 960-mile route.
- (b) Find the cost as a function of mileage for hauls between 100 and 400 miles from the first city.
- (c) Find the cost as a function of mileage for hauls between 400 and 800 miles from the first city.

(a) Choose the correct graph below.

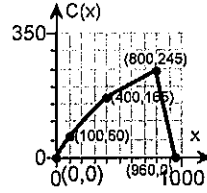
A.



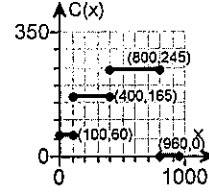
B.



C.



D.



(b) The cost as a function of mileage for hauls between 100 and 400 miles from the first city is $C(x) =$ _____ .
(Type an expression using x as the variable.)

(c) The cost as a function of mileage for hauls between 400 and 800 miles from the first city is $C(x) =$ _____ .
(Type an expression using x as the variable.)

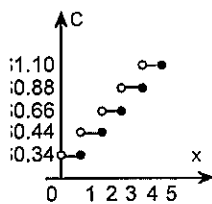
6. The postal service of a country charges \$0.34 postage for a letter weighing up to 1 ounce, plus \$0.22 for each additional ounce up to 5 ounces. Letters weighing more than 5 ounces do not qualify for these rates.

(a) Write a piecewise-defined function C for the postage charged for a letter weighing x ounces.

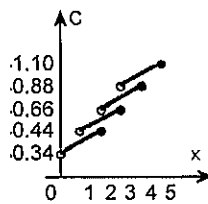
$$C(x) = \begin{cases} \$ \underline{\hspace{2cm}} & \text{if } 0 < x \leq 1 \\ \$ \underline{\hspace{2cm}} & \text{if } 1 < x \leq 2 \\ \$ \underline{\hspace{2cm}} & \text{if } 2 < x \leq 3 \\ \$ \underline{\hspace{2cm}} & \text{if } 3 < x \leq 4 \\ \$ \underline{\hspace{2cm}} & \text{if } 4 < x \leq 5 \end{cases}$$

(b) Graph the function. Choose the correct graph below.

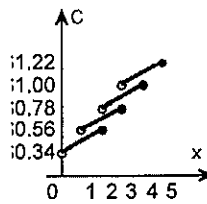
A.



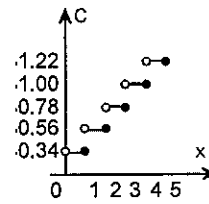
B.



C.



D.



1. B. There is no absolute maximum for $y = f(x)$.

B. There is no absolute minimum for $y = f(x)$.

2. 9

257.60

3. 17

16.5

16.1

16.01

16.001

B.

The slopes of the secant lines are getting smaller and smaller and the secant lines are beginning to look more and more like the tangent line to the graph of f at the point where $x = 8$.

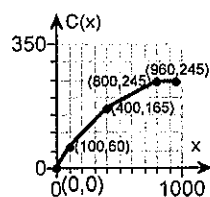
16

4. 24.99

37.49

25.24

5.



B.

$25 + 0.35x$

$85 + 0.20x$

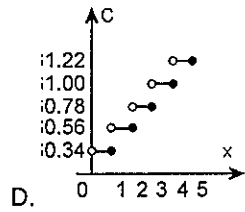
6. 0.34

0.56

0.78

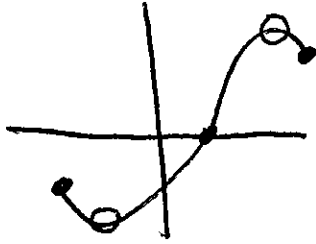
1.00

1.22



2.3-2.4 classwork

①



\boxed{B} no absolute max

\boxed{B} no absolute min

* open circle

②
$$\bar{C}(x) = .6x^2 + 19x - 262 + \frac{2700}{x}$$

* calculator minimum

9.436 \rightarrow $\boxed{9}$ lawn mowers

* table of values
for 9

= $\boxed{\$257.60}$

2.3-2.4 classwork continued

③ Avg rate of change $\frac{f(b)-f(a)}{b-a}$

$$f(x) = x^2$$

a) 8 to 9 $\frac{9^2 - 8^2}{9 - 8} = \boxed{17}$

b) 8 to 8.5 $\frac{8.5^2 - 8^2}{8.5 - 8} = \boxed{16.5}$

c) 8 to 8.1 $\frac{8.1^2 - 8^2}{8.1 - 8} = \boxed{16.1}$

d) 8 to 8.01 $\frac{8.01^2 - 8^2}{8.01 - 8} = \boxed{16.01}$

e) 8 to 8.001 $\frac{8.001^2 - 8^2}{8.001 - 8} = \boxed{16.001}$

f) Secant line

* The avg rate of change equals the slope of secant line

\boxed{B}

g) Slope of secant approaching $\boxed{16}$

2.3-2.4 classwork continued

$$\textcircled{4} C(x) = \begin{cases} 24.99 & \text{if } 0 < x \leq 300 \\ .25x - 50.01 & \text{if } x > 300 \end{cases}$$

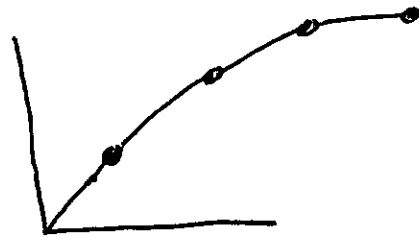
a) $C(175) = \boxed{24.99}$

b) $C(350) = .25(350) - 50.01 = \boxed{37.49}$

c) $C(301) = .25(301) - 50.01 = \boxed{25.24}$

$\textcircled{5}$

a) $\boxed{\text{Graph B}}$



b) $.60(100) + .35(x-100)$
 $= \boxed{.35x + 25}$

c) $.60(100) + .35(300) + .2(x-400)$
 ~~$= 188$~~
 $= \boxed{.20x + 85}$

2.3-2.4 continued

⑥ .34 up to 1 ounce

.22 each additional up to 5

$$C(x) = \begin{cases} .34 & \text{if } 0 < x \leq 1 \\ .56 & \text{if } 1 < x \leq 2 \\ .78 & \text{if } 2 < x \leq 3 \\ 1.00 & \text{if } 3 < x \leq 4 \\ 1.22 & \text{if } 4 < x \leq 5 \end{cases}$$

Graph D

