

Practice for Chapter 2 Name _____

Applied Calculus 05 (Goldstein10th) created 7 Feb 05 ptch2_appcalc_05g10.tst

DO NOT EXPECT THE TESTS TO BE THE SAME. TESTS MAY BE TOTALLY DIFFERENT.

You need to attend class, pay attention and do your homework to learn statistics and prepare for the tests.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

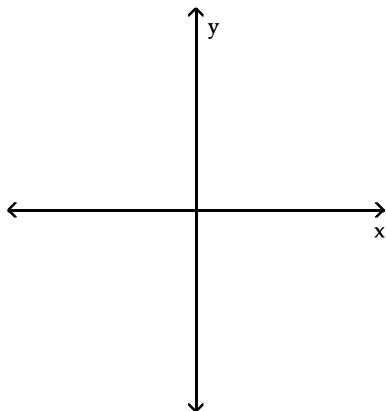
- 1) Determine all the values of x where relative maximum and minimum points of the function _____ 1)

$f(x) = \frac{1}{3}x^3 - \frac{3}{2}x^2 - 10x$ occur. Distinguish the maxima from the minima using the second derivative rule.

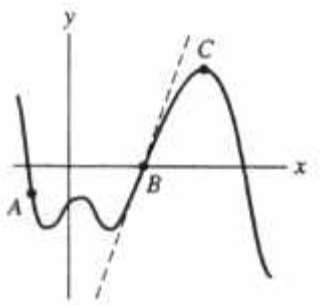
- 2) Determine the values of x for which $f(x) = x^3 - 6x$ is concave down. _____ 2)

- 3) Sketch the graph of a function having the given properties: _____ 3)

- (I) $f'(x) > 0$ for all x
- (II) $f''(x) > 0$ for all $x < 0$, $f''(x) < 0$ for $x > 0$
- (III) asymptotes at $y = \frac{\pi}{2}$, $y = -\frac{\pi}{2}$



- 4) Points A , B , and C lie on the graph of a function $f(x)$, as shown on the diagram. _____ 4)

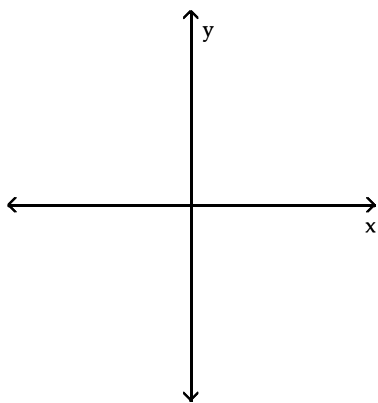


Fill in the each blank of the table below with either "positive," "negative," or "0" to indicate the sign of $f(x)$, $f'(x)$, and $f''(x)$ at A , B , and C

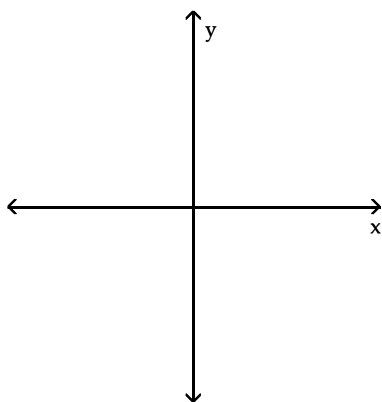
	$f(x)$	$f'(x)$	$f''(x)$
A			
B			
C			

5) Determine all relative maximum, minimum, and inflection points of $f(x) = 2x^3 - 9x^2 + 12x - 1$. 5) _____

6) Sketch the graph of the function $f(x) = -x^3 + 3x^2 + 9x - 15$, indicating all relative extrema and inflection points. 6) _____



7) Sketch the graph of $f(x) = 9x + 1 + \frac{1}{x}$, $x > 0$. 7) _____



8) A homebuilder's advertisement promises a house with a finished recreation room of 300 square feet. Two perpendicular walls of the room are to be paneled at a cost of \$5 per running foot. A third side will be built out of windows at a cost of \$10 per running foot. The fourth side will use the existing cinder block. What dimension should the room have to minimize the homebuilder's cost? 8) _____

9) The demand equation for a monopolist is $p = 1050 - 0.03x$ and the cost function is $C(x) = 150x + 750,000$, where x is the number of units produced. 9) _____

(a) Find the value of x that maximizes the profit and determine the corresponding price and total profit for this level of production.

(b) Suppose that, in order to spur economic activity, the government reduces taxes so that the monopolist's costs are reduced by \$1,000,000. What is the resulting change in the monopolist's profit?

- 10) A large rectangular garden is to be enclosed by a fence and divided into 5 regions by 4 parallel fences across the interior of the garden as shown below. 10) _____



Find the overall dimensions of the garden, if a total of 1200 feet of fencing is to be used and the area maximized.

- 11) An open box with square ends is to be constructed with a volume of 125 cubic inches. The bottom is to be made of a material that weighs twice as much per square inch as the material used for the sides. What should the dimensions of the box be in order to minimize its weight? (*Note: the actual weights of the materials do not matter!*) 11) _____
- 12) A health food store stocks bottles of multivitamins. It orders equal quantities of stock from its wholesaler at equally spaced points throughout the year. The cost of replacing each order is \$250. Moreover, the cost of keeping a jar of vitamins in inventory is \$1 per year. The store predicts that it will sell 12,500 bottles of vitamins in the next year. How many orders of how many bottles each will result in a minimum cost to the health food store? 12) _____

Answer Key

Testname: PTCH2_APPCALC_05G10

- 1) relative minimum at $x = 5$; relative maximum at $x = -2$

ID: CALC10G 2.2.2-1+

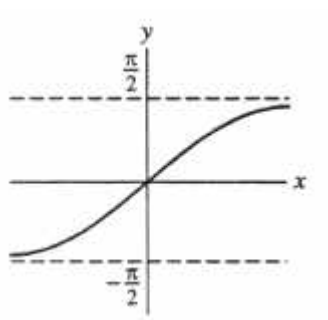
Page Ref:

- 2) concave down for $x < 0$

ID: CALC10G 2.2.2-3

Page Ref:

- 3)



ID: CALC10G 2.2.2-6

Page Ref:

- 4)

	$f(x)$	$f'(x)$	$f''(x)$
A	neg.	neg.	pos.
B	0	pos.	0
C	pos.	0	neg.

ID: CALC10G 2.2.2-4

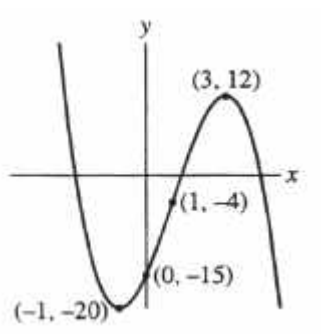
Page Ref:

- 5) $(1, 4)$ is a relative maximum; $(2, 3)$ is a relative minimum; $\left(\frac{3}{2}, \frac{7}{2}\right)$ is an inflection point.

ID: CALC10G 2.3.2-5

Page Ref:

- 6)



relative maximum at $(3, 12)$; relative minimum at $(-1, -20)$; point of inflection at $(1, -4)$

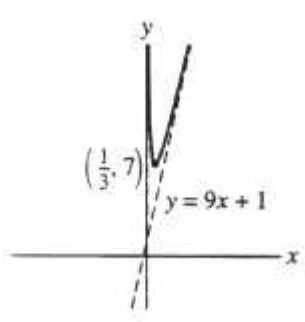
ID: CALC10G 2.3.2-9

Page Ref:

Answer Key

Testname: PTCH2_APPCALC_05G10

7)



ID: CALC10G 2.4.2-5

Page Ref:

8) 30 ft \times 10 ft (10 ft = window side)

ID: CALC10G 2.5.2-9

Page Ref:

9) Originally $x = 15,000$ units, price = \$600/unit, profit = \$6,000,000; after the tax cut, profits increase by \$1,000,000 to \$7,000,000.

ID: CALC10G 2.5.2-11

Page Ref:

10) 300 ft \times 100 ft

ID: CALC10G 2.5.2-13

Page Ref:

11) 5 in \times 5 in \times 5 in

ID: CALC10G 2.6.2-2

Page Ref:

12) 5 orders of 2500 bottles each

ID: CALC10G 2.6.2-4

Page Ref: