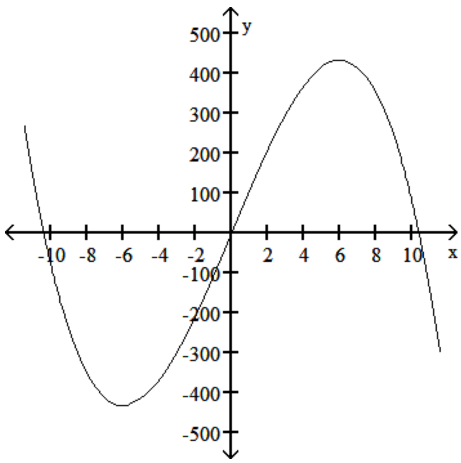
MAC2233 Practice 04

4.1 First Derivative and Graphs
4.2 Second Derivative and Graphs
4.4 Curve Sketching.

Use the given graph of f(x) to find the intervals on which $f'(x) > 0$.

1) 1) ________



A) $f'(x) > 0$ on $[-36, 36]$, $f'(x) < 0$ on $(-\infty, -36] \cup [36, \infty)$
B) $f'(x) > 0$ on $(-\infty, -6] \cup [6, \infty)$, $f'(x) < 0$ on $[-6, 6]$
C) $f'(x) > 0$ on $(-\infty, 6]$, $f'(x) < 0$ on $[6, \infty)$
D) $f'(x) > 0$ on $[-6, 6]$, $f'(x) < 0$ on $(-\infty, -6] \cup [6, \infty)$

Provide an appropriate response.

2) Determine the intervals for which the function $f(x) = x^3 + 18x^2 + 2$, is decreasing. 2) ________

A) (0, 12) and (12, ∞)
B) (-12, 0)
C) ($-\infty$, -12) and (0, ∞)
D) ($-\infty$, -12) and (-12, 0)

3) Find the critical values and determine the intervals where f(x) is decreasing and the intervals where f(x) is increasing for $f(x) = 3x^4 - 6x^2 + 7$. 3) ________

A) decreasing on (-1, 0) and (1, ∞); increasing on ($-\infty$, -1) and (0, 1)
B) decreasing on (-1, 0) and (1, ∞); increasing on ($-\infty$, -1)
C) increasing on (-1, 0) and (1, ∞); decreasing on ($-\infty$, -1) and (0, 1)
D) increasing on (-1, 0); decreasing on ($-\infty$, -1) and (0, 1)

4) Use the first derivative test to determine the local extrema, if any, for the function: $f(x) = 3x^4 - 6x^2 + 7$. 4) ________

A) local min at x = 0 and local max at x = -1 and x = 1
B) local max at x = -1 and local min at x = 0 and x = 1
C) local max at x = 1 and local min at x = 0
D) local max at x = 0 and local min at x = -1 and x = 1

5) Determine the interval(s) over which $f(x) = (x + 3)^3$ is concave upward. 5) ________

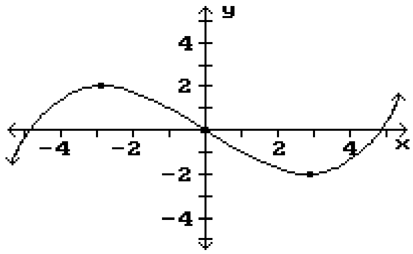
A) ($-\infty$, ∞)
B) (-3, ∞)
C) ($-\infty$, 3)
D) ($-\infty$, -3)

6) Find the inflection point(s) for $f(x) = x^3 - 6x - 1$. 6) ________

A) (0, -6)
B) (-1, 6)
C) (1, -1)
D) (0, -1)

Find the intervals where the function has the indicated concavity. Give the x coordinates of inflection points.

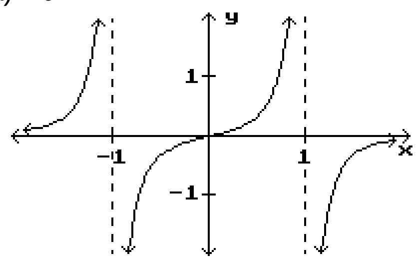
7) Concave upward 7) ________



A) (0, ∞); x = 0 B) (0, ∞); no inflection points
C) (-3, 3); x = 0 D) (-3, ∞); x = 0

Find the intervals where f''(x) < 0 ir f''(x) > 0 as indicated.

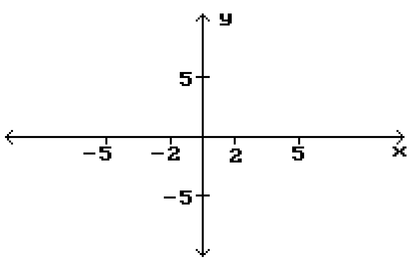
8) f''(x) < 0 8) ________



A) (1, ∞) B) (-∞, -1) C) (-1, 0) , (1, ∞) D) (-1, 0)

Sketch a graph of a single function that has these properties.

9) a) Continuous for all real numbers 9) ______________
b) Differentiable everywhere except x = 0
c) f′(x) < 0 on (-∞ , 0)
d) f′(x) > 0 on (0 , ∞)
e) f′′(x) < 0 on (-∞ , 0) and (0, ∞)
f) f(-2) = f (2) = 5
g) y-intercept and x-intercept at (0, 0)



Answer Key
Testname: PRACTICE04

1) D
2) B
3) C
4) D
5) D
6) D
7) A
8) C
9)