AB: Q203 – LESSON 4: PRACTICE EXAMINATION

TECHNOLOGY SECTION: *Round answers to three decimal places.*

1. The velocity of a particle moving along a horizontal is given as $v(t) = 8\cos(t) + \ln(\sin(t) + t^2)$ on $0.1 < t \leq 8$

A. On what time interval is the particle moving to the right? Justify.

B. What are the velocity and acceleration at time $t = 5$?

C. Is the particle speeding up or slowing down at $t = 3.5$? Justify.

2. The derivative of f is given by $f'(x) = e^{x^2} - 5x^3 + x$ on $0 \leq t < 3$

A. On what interval is f decreasing? Justify.

B. At what x-value(s) does f have a relative maximum? Justify.

C. On what interval is f concave upward? Justify.

NO TECHNOLOGY SECTION

1. (SKIP - THIS QUESTION WILL BE USED IN Q204)
Let f be defined by $f(\mathrm{x}) = \ln(2 + \sin\mathrm{x})$ for $\pi \leq \mathrm{x} \leq 2\pi$.
Find the absolute maximum value and the absolute minimum value of f using the closed interval test.

2. Let $f''(x) = (x-1)(x+2)^2 e^{x^2}$.

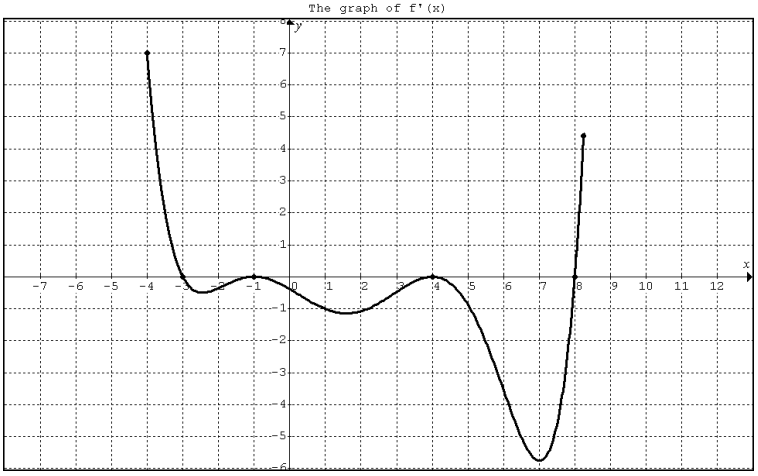
A. When is the graph of $f(x)$ concave upward? Justify.

B. How many points of inflection are on f? Justify.

3. A particle moves along a horizontal line. It's position at time t is given as $s(t) = \frac{2}{3}t^3 - \frac{5}{2}t^2 - 3t$.

On what time interval is the particle slowing down? Justify.

4. Consider the graph of the ***derivative*** of f below.



A. For what x – value(s) does f have a local minimum? Justify.

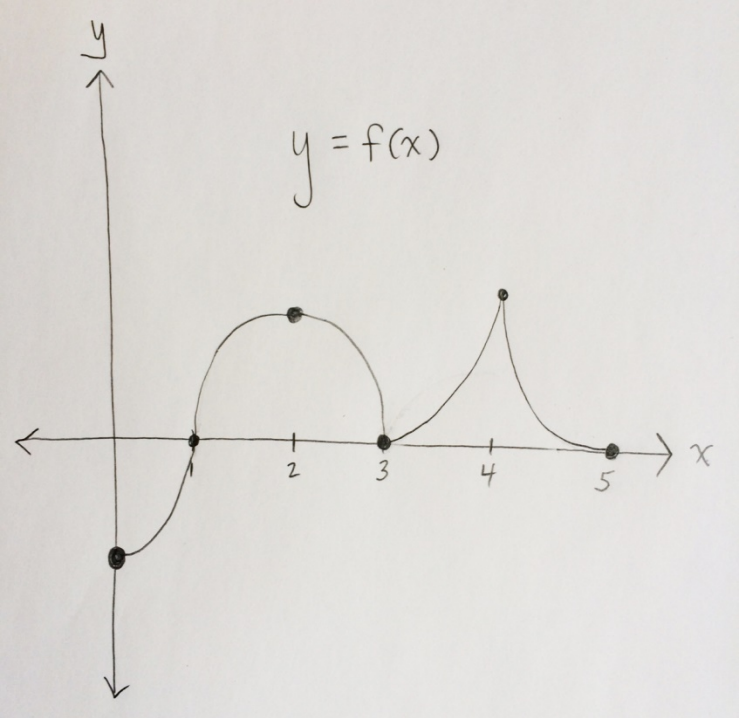
B. On what interval is f increasing? Justify.

C. Estimate the interval(s) on which f is concave upward? Justify.

D. How many points of inflection are on f? Justify.

GRAPH THEORY

5. Below is Steven's graph of $y = f(x)$.



THE CHART REPRESENTS STEVEN'S GRAPH

x	0	$0 < x < 1$	1	$1 < x < 2$	2	$2 < x < 3$	3	$3 < x < 4$	4	$4 < x < 5$	5
$f(x)$									+		
$f'(x)$			DNE								
$f''(x)$											

FILL IN EACH BLANK IN THE CHART ABOVE WITH ONE OF THE FOLLOWING:

+ for positive

– for negative

0 for zero

DNE for Does not Exist