Fall AB MC Calculator-Portion Graph Review

1)

The graph of $y = x^4 - x^2 - e^{2x}$ changes concavity at $x =$

(A) -0.641 (B) -0.531 (C) -0.421 (D) -0.311 (E) -0.201

2)

(Calculator) For what value of c on $0 < x < 1$ is the tangent to the graph of $f(x) = e^x - x^2$ parallel to the secant line on the interval [0, 1]?

a) -0.248 b) 0.351 c) 0.500 d) 0.693 e) 0.718

3)

(Calculator section) An object moving along a line has velocity $v(t) = t\cos(t) - \ln(t+2)$, where $0 \le t \le 10$.

a) For what value(s) of t is the object motionless?

b) How many times does the object reverse direction?

4)

The first derivative of a function f is given by

$f'(x) = \frac{\cos x(2x\sin x - \cos x)}{x^2}$. On the interval $0 < x < 8$, how many relative maxima does the function f have?

A. 0

B. 1

C. 2

D. 3

E. 4

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5)

A particle moves along the x-axis so that at any time $t \geq 0$, its velocity is given by $v(t) = 3 + 4.1\cos(0.9t)$. What is the acceleration of the particle at time $t = 4$?

(A) -2.016 (B) -0.677 (C) 1.633 (D) 1.814 (E) 2.978

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6)

The function f has first derivative given by $f'(x) = \frac{\sqrt{x}}{1 + x + x^3}$. What is the x-coordinate of the inflection point of the graph of f ?

(A) 1.008 (B) 0.473 (C) 0 (D) -0.278 (E) The graph of f has no inflection point.

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7)

Let f be the function with derivative given by $f'(x) = \sin(x^2 + 1)$. How many relative extrema does f have on the interval $2 < x < 4$?

(A) One (B) Two (C) Three (D) Four (E) Five

set $y''(x) = 0$ $\boxed{B}$

1) The graph of $y = x^4 - x^2 - e^{2x}$ changes concavity at $x =$

(A) –0.641 (B) –0.531 (C) –0.421 (D) –0.311 (E) –0.201

$y = x^4 - x^2 - e^{2x}$

$y' = 4x^3 - 2x - 2e^{2x}$

$y'' = 12x^2 - 2 - 4e^{2x}$

$0 = 12x^2 - 2 - 4e^{2x}$

$x \approx -0.5309 = \boxed{-0.531}$

Ans $\boxed{B}$

2) (Calculator) For what value of c on 0 < x < 1 is the tangent to the graph of $f(x) = e^x - x^2$ parallel to the secant line on the interval [0, 1]?

$f'(x)$

$\frac{f(b)-f(a)}{b-a}$

a) -0.248 $\boxed{\text{b) } 0.351}$ c) 0.500 d) 0.693 e) 0.718

Find c-value using Mean Value Theorem set $f'(c) = \frac{f(b)-f(a)}{b-a}$ and solve for c

$f'(x) = e^x - 2x$

$f(0) = e^0 - 0 = 1$

$f(1) = e^1 - 1 = e - 1$

$\frac{f(1)-f(0)}{1-0} = \frac{e-1-1}{1} = e - 2$

$e^x - 2x = e - 2$

Use calculator to find intersection b/t 2 graphs

OR... $e^x - 2x - e + 2 = 0$

Graph and look for x-int between interval.

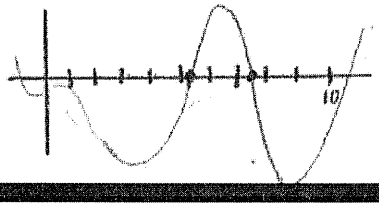
3) (Calculator section) An object moving along a line has velocity $v(t) = t\cos(t) - \ln(t + 2)$, where $0 \le t \le 10$.

a) For what value(s) of t is the object motionless? when $v(t) = 0$

$x = 5.107$

$x = 7.55$

$v(t)$



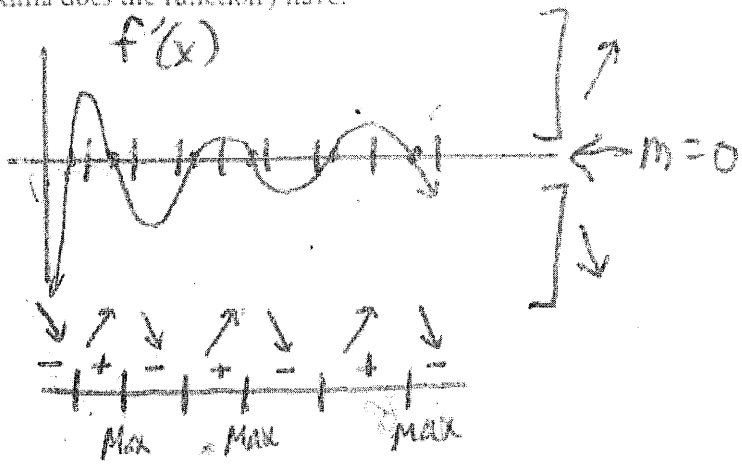
b) How many times does the object reverse direction? twice, at $t = 5.107, 7.550$

$v(t)$ − + −

0 5.107 7.55 10

4) The first derivative of a function f is given by $f'(x) = \frac{\cos x(2x\sin x - \cos x)}{x^2}$. On the interval $0 < x < 8$, how many relative maxima does the function f have?

A. 0
B. 1
C. 2
D. 3
E. 4



5) A particle moves along the x-axis so that at any time $t \geq 0$, its velocity is given by $v(t) = 3 + 4.1\cos(0.9t)$. What is the acceleration of the particle at time $t = 4$?

(A) −2.016 (B) −0.677 (C) 1.633 (D) 1.814 (E) 2.978

$v'(4) = 1.633$

$a(4) = 1.633$

* nderiv(v(t), x, 4)

6) The function f has first derivative given by $f'(x) = \frac{\sqrt{x}}{1 + x + x^3}$. What is the x-coordinate of the inflection point of the graph of f?

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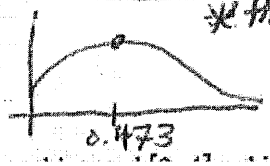
* the relative max/min value of $f'(x)$ is the POI of $f(x)$.



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