Name

Answers

Use your calculator to solve each problem below!

1) A particle moves along a straight line with velocity given by $v(t) = 7 - (1.01)^{-t^2}$ at time $t \geq 0$. What is the acceleration of the particle at time $t = 3$?

(A) −0.914   (B) 0.055   (C) 5.486   (D) 6.086   (E) 18.087

2) The first derivative of the function f is defined by $f'(x) = \sin(x^3 - x)$ for $0 \leq x \leq 2$. On what interval(s) is f increasing?
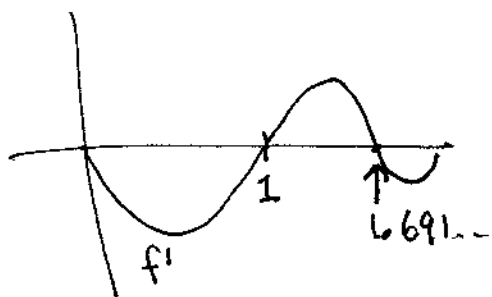
(A) $1 \leq x \leq 1.445$

(B) $1 \leq x \leq 1.691$

(C) $1.445 \leq x \leq 1.875$

(D) $0.577 \leq x \leq 1.445$ and $1.875 \leq x \leq 2$

(E) $0 \leq x \leq 1$ and $1.691 \leq x \leq 2$

f'

1

1.691

3) The derivative of the function f is given by $f'(x) = x^2 \cos(x^2)$. How many points of inflection does the graph of f have on the open interval $(-2, 2)$?
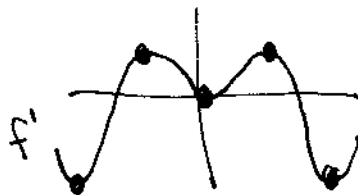
(A) One   (B) Two   (C) Three   (D) Four   (E) Five

Be sure window shows enough y-values!

f'

4) 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 $t = 4$?
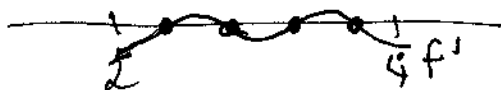
(A) −2.016   (B) −0.677   (C) 1.633   (D) 1.814   (E) 2.978

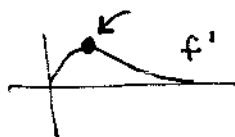$$v'(t) = a(t)$$

5) 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 $2 < x < 4$?

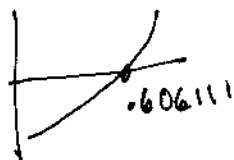(A) One   (B) Two   (C) Three   (D) Four   (E) Five

6) The function f has first derivative given by $f'(x) = \dfrac{\sqrt{x}}{1 + x + x^3}$. 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.

7) The graph of $y = e^{\tan x} - 2$ crosses the x-axis at one point in the interval $[0, 1]$. What is the slope of the graph at this point?

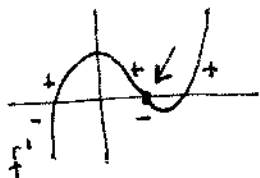(A) 0.606   (B) 2   (C) 2.242   (D) 2.961   (E) 3.747

$$\frac{d}{dx}(y_1)\Big|_{.60611\dots} = 2.96091\dots$$

8) If $f'(x) = \sqrt{x^4 + 1} + x^3 - 3x$, then f has a local maximum at $x =$

(A) −2.314   (B) −1.332   (C) 0.350   (D) 0.829   (E) 1.234

9) For $-1.5 < x < 1.5$, let f be a function with first derivative given by $f'(x) = e^{(x^4 - 2x^2 + 1)} - 2$. Which of the following are all intervals on which the graph of f is concave down?

(A) $(-0.418, 0.418)$ only

(B) $(-1, 1)$

(C) $(-1.354, -0.409)$ and $(0.409, 1.354)$

(D) $(-1.5, -1)$ and $(0, 1)$

(E) $(-1.5, -1.354)$, $(-0.409, 0)$, and $(1.354, 1.5)$

when slope of f' is neg.

f'' is −

& f is concave down