PRINTABLE VERSION

Quiz 13

Question 1

Describe the concavity of the graph of $f(x) = x^3 - 2x + 6$ and find the points of inflection (if any).

a) concave down on $\left(-\infty, \frac{1}{3}\right)$; concave up on $\left(\frac{1}{3}, \infty\right)$; pt of inflection $\left(\frac{1}{3}, 0\right)$.

b) concave down on $(-\infty, \infty)$; no points of inflection

c) concave up on $(-\infty, 0)$; concave down on $(0, \infty)$; pt of inflection $(0, 6)$.

d) concave down on $(-\infty, 0)$; concave up on $(0, \infty)$; pt of inflection $(0, 6)$.

e) concave up on $(-\infty, \infty)$; no points of inflection

Question 2

Describe the concavity of the graph of $f(x) = \frac{7}{4}x^4 - \frac{7}{2}x^2$ and find the points of inflection (if any).

a) concave down on $(-\infty, \infty)$; no points of inflection

b) concave down on $(-\infty, 0)$; concave up on $(0, \infty)$; pt of inflection $(0, 0)$.

c) concave up on $\left(-\infty, -\frac{\sqrt{3}}{3}\right)$ and $\left(\frac{\sqrt{3}}{3}, \infty\right)$; concave down on $\left(-\frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right)$; pts of inflection $\left(\frac{\sqrt{3}}{3}, -\frac{35}{36}\right)$ and $\left(-\frac{\sqrt{3}}{3}, -\frac{35}{36}\right)$.

d) concave up on $(-\infty, 0)$; concave down on $(0, \infty)$; pt of inflection $(0, 0)$.

e) concave down on $\left(-\infty, -\frac{\sqrt{3}}{3}\right)$ and $\left(\frac{\sqrt{3}}{3}, \infty\right)$; concave up on $\left(-\frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right)$; pts of inflection $\left(\frac{\sqrt{3}}{3}, -\frac{35}{36}\right)$ and $\left(-\frac{\sqrt{3}}{3}, -\frac{35}{36}\right)$.

Question 3

Describe the concavity of the graph of $f(x) = \frac{2x}{9x^2 - 4}$ and find the points of inflection (if any).

a) concave up on $(-\infty, 0)$; concave down on $(0, \infty)$; pt of inflection $(0, 0)$.

b) concave down on $\left(-\infty, -\frac{2}{3}\right)$ and $\left(0, \frac{2}{3}\right)$; concave up on $\left(-\frac{2}{3}, 0\right)$ and $\left(\frac{2}{3}, \infty\right)$; pt of inflection $(0, 0)$.

c) concave down on $\left(-\infty, \frac{2}{3}\right)$; concave up on $\left(\frac{2}{3}, \infty\right)$; pt of inflection $\left(\frac{2}{3}, 0\right)$.

d) concave down on $(-\infty, \infty)$; no points of inflection

e) concave up on $\left(-\frac{2}{3}, \frac{2}{3}\right)$; concave down on $\left(-\infty, -\frac{2}{3}\right)$ and $\left(\frac{2}{3}, \infty\right)$; pts of inflection $\left(-\frac{2}{3}, 0\right)$ and $\left(\frac{2}{3}, 0\right)$.

Question 4

Describe the concavity of the graph of $f(x) = 2(x-3)^{5/3}$ and find the points of inflection (if any).

a) concave up on $(-\infty, 0)$); concave down on $(0, \infty)$; pt of inflection $(0, 0$.

b) concave down on $(-\infty, \infty)$; no points of inflection

c) concave up on $(-\infty, \infty)$; no points of inflection

d) concave down on $(-\infty, 3)$; concave up on $(3, \infty)$; pt of inflection $(3, 0)$.

e) concave up on $(-\infty, -3)$; concave down on $(-3, \infty)$; pt of inflection $(-3, 0)$.

Question 5

Describe the concavity of the graph of $f(x) = 8x^2 - 8\sin(2x)$ on the interval $[0, \pi]$.

a) concave up on $\left(0, \frac{\pi}{12}\right)$; concave down on $\left(\frac{\pi}{12}, \pi\right)$.

b) concave up on $\left(0, \frac{7\pi}{12}\right)$; concave down on $\left(\frac{7\pi}{12}, \pi\right)$.

c) concave up on $\left(0, \frac{7\pi}{12}\right)$ and on $\left(\frac{11\pi}{12}, \pi\right)$; concave down on $\left(\frac{7\pi}{12}, \frac{11\pi}{12}\right)$.

d) concave up on $\left(\frac{7\pi}{12}, \frac{11\pi}{12}\right)$; concave down on $\left(0, \frac{7\pi}{12}\right)$ and on $\left(\frac{11\pi}{12}, \pi\right)$.

e) concave down on $(0, \pi)$.

Question 6

Find c so that the graph of $f(x) = cx^2 + x^{-2}$ has a point of inflection at $(4, f(4))$.

a) $c = -\frac{3}{128}$

b) $c = -\frac{3}{256}$

c) $c = \frac{3}{128}$

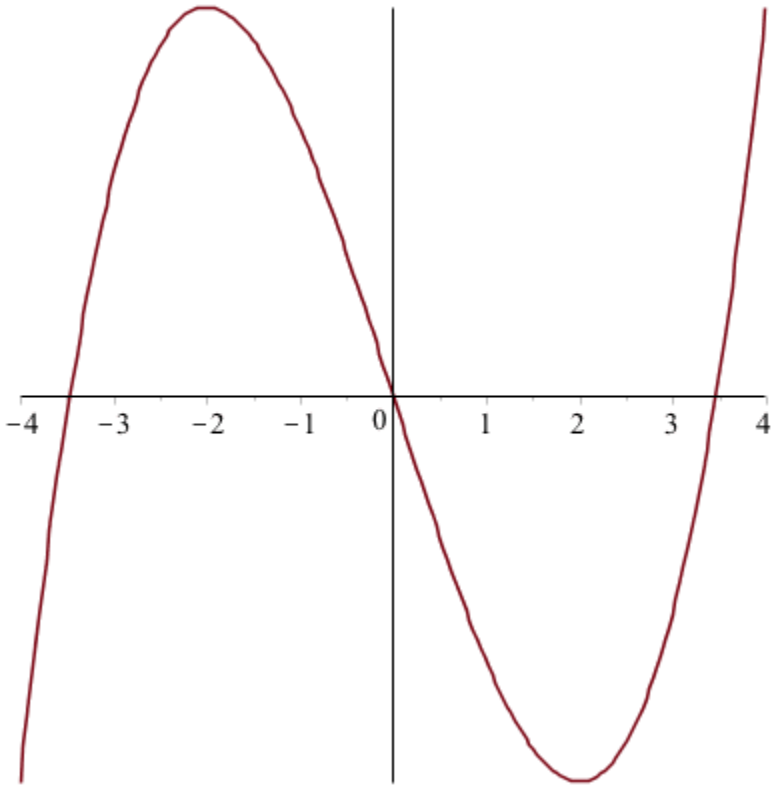
d) $c = \frac{3}{256}$

e) $c = 0$

Question 7

The graph of $f'(x)$ is shown below. Give the interval(s) where the graph of

$f(x)$ is concave up.



a) $(-\infty, 0)$ and $(2, \infty)$

b) $(-\infty, -2)$ and $(2, \infty)$

c) $(-\infty, 0)$

d) $(0, \infty)$

e) $(-2, 2)$

Question 8

Which of the following is true about the graph of $f(x) = 6x^3 - 12x^2 + 6x - 7$?

a) $f(x)$ has a local minimum at the point $\left(\frac{1}{3}, -\frac{55}{9}\right)$.

b) $f(x)$ is decreasing on the interval $\left(\frac{1}{3}, 1\right)$.

c) $f(x)$ has a local maximum at the point $(1, -7)$.

d) $f(x)$ is increasing on the interval $\left(\frac{2}{3}, \infty\right)$.

e) $f(x)$ has a point of inflection at the point $(1, -7)$.

Question 9

Which of the following is true about the graph of $f(x) = 2\sin^3(x) + 3\ \sin(x) + 1$ on the interval $[0, \pi]$?

a) $f(x)$ has a local minimum at the point $\left(\frac{\pi}{2}, 6\right)$.

b) $f(x)$ is increasing on the interval $\left(\frac{\pi}{2}, \pi\right)$.

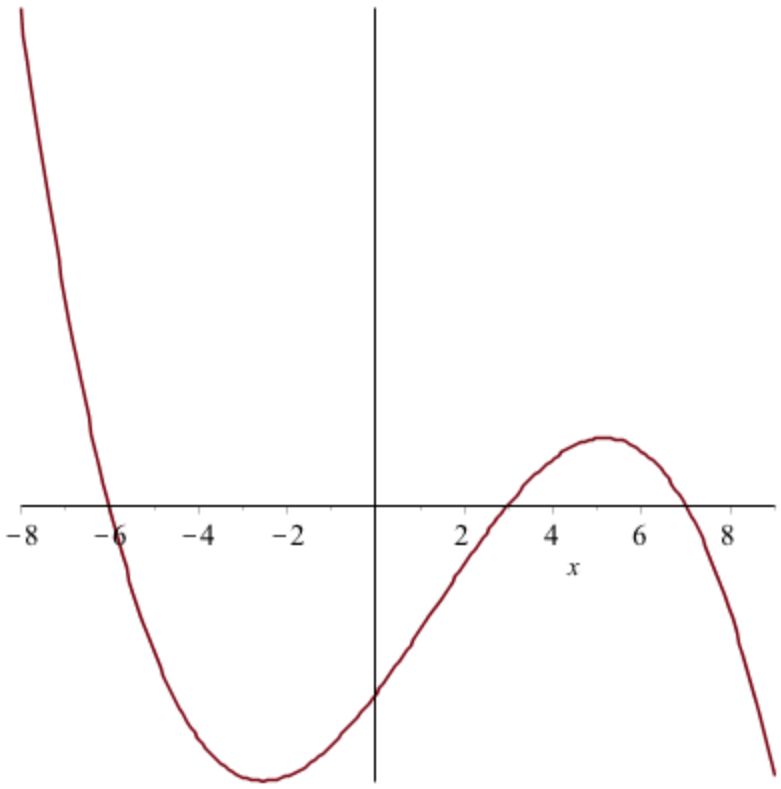
c) $f(x)$ is concave down on the interval $(0, \pi)$.

d) $f(x)$ has points of inflection at the points $\left(\frac{\pi}{4}, 2\sqrt{2} + 1\right)$ and $\left(\frac{3\pi}{4}, 2\sqrt{2} + 1\right)$.

e) $f(x)$ is concave up on the interval $(0, \pi)$.

Question 10

Given the graph of $f'(x)$ below, where is $f(x)$ decreasing?



a) $f(x)$ is decreasing on the interval $(-6, 7)$.

b) $f(x)$ is decreasing on the intervals $(-6, 3)$ and $(7, \infty)$.

c) $f(x)$ is decreasing on the interval $(-6, \infty)$.

d) $f(x)$ is decreasing on the intervals $(-\infty, -6)$ and $(3, 7)$.

e) $f(x)$ is decreasing on the interval $(-\infty, 7)$.