Answers to review problems-Exam#2

MATH 1210 - Fall 2004

(1) (a)$D_f : \mathbb{R}\backslash\{1\}$, x-intercept: $(0,0)$, y-intercept: $(0,0)$. (b) H.A. $y = 1$, V.A. $x = 1$, O.A. DNE. (c) Critical points: $x = 0$ and $x = 1$. There are no inflection points. f is decreasing on: $(-\infty, 1)$ and $(1, \infty)$. f is concave up on: $(1, \infty)$ and concave down on $(-\infty, 1)$. (d) There are no inflection points, local maxima, local minima, global maximum and global minimum.

(2) (a)$D_f : \mathbb{R}\backslash\{0\}$, x-intercept: None, y-intercept: None. (b) H.A. None, V.A. $x = 0$, O.A. $y = x$. (c) Critical points: $x = -1$, $x = 0$ and $x = 1$. There are no inflection points. f is increasing on: $(-\infty, -1)$ and $(1, \infty)$. f is decreasing on: $(-1, 0)$ and $(0, 1)$. f is concave up on: $(0, \infty)$ and concave down on $(-\infty, 0)$. (d) Local maximum of -2 at $x = -1$ and local minimum of 2 at $x = 1$. There are no inflection points, global maximum and global minimum.

(3) $h = \dfrac{20\sqrt{3}}{3}$ units.

(4) Global maximum value: $\dfrac{9}{8}$ and global minimum value: -2.

(5) $\left(\dfrac{1}{2}, \sqrt{\dfrac{3}{2}}\right)$ and $\left(\dfrac{1}{2}, -\sqrt{\dfrac{3}{2}}\right)$.

(6) Global minimum value: 2.

(7) $F(x) = \tan x + 5 \sin x + C$.

(8) $\dfrac{3}{2}\sqrt{2y^2 + 1} + C$.

(9) $s(t) = -\cos t - \sin t + 4t - 4$ units.

(10) $\sqrt{2}$ by $2\sqrt{2}$.

(11) ∞.

(12) $\dfrac{2}{3}$

(13) 0.

(14) $y = \left(\dfrac{x^3}{6} + \dfrac{11}{6}\right)^2$ and $y = \left(\dfrac{x^3}{6} - \dfrac{13}{6}\right)^2$.

(15) $c = \sqrt[3]{\dfrac{9}{2}}$.

(16) The Main Value Theorem cannot be applied because f is not differentiable at 0, see the graph.

(17) 30.

(18) $4\pi + 4$.

(19) $2x \cos x - \cos \sqrt{x}$.

(20) $\dfrac{318}{10}\sqrt[3]{2} - \dfrac{57}{20}$.

(21) $\dfrac{1}{12}\sin^3(2x^2 + 1) + C$.

(22) 22.

(23) (a) Lower bound: $\dfrac{50}{9}$ and upper bound: 18. (b) Lower bound: -6π and upper bound: 6π.

(24) $\dfrac{1}{5}$.

(25) $\dfrac{3}{2}\sin\left(\sqrt[3]{z^2 + 3}\right) + C$.

(26) $\dfrac{10}{3} + 2\sqrt{3}$.

(27) $\frac{1}{3} + \sqrt{3}$.

(28) (a)0. (b) 0. (c) -8. (d) 10.(e) 0. (f) -2. (g) 5.

(29) $\frac{1}{3}$.