MATH 1712 D1-D3

Test #2

Full Name Key

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Version A

March 4, 2009

Circle your TA's name: D1 - Lacy Hardcastle D2 - Kyla (Hewell) Adams D3 - Kelly Robinson

1. Let
$$y^6 + x^3 + (3y - x)^5 = 20$$
. Find $\frac{dy}{dx}$.

$$6y^{5} \frac{dy}{dx} + 3x^{2} + 5(3y - x)^{4} (3 \frac{dy}{dx} - 1) = 0$$

$$6y^{5} \frac{dy}{dx} + 3x^{2} + 15(3y - x)^{4} \frac{dy}{dx} - 5(3y - x)^{4} = 0$$

$$6y^{5} \frac{dy}{dx} + 15(3y - x)^{4} \frac{dy}{dx} = -3x^{2} + 5(3y - x)^{4}$$

$$(15pts) \left[6y^{5} + 15(3y - x)^{4} \right] \frac{dy}{dx} = -3x^{2} + 5(3y - x)^{4}$$

$$\frac{dy}{dx} = \frac{-3x^2 + 5(3y - x)^4}{6y^5 + 15(3y - x)^4}$$

2. Use a differential (or the tangent line approximation method) to approximate
$$y = \frac{1}{\sqrt{2}}$$

Let
$$f(x) = \frac{1}{\sqrt{x}} = x^{-\frac{1}{2}}$$

$$f'(x) = -\frac{1}{2}x^{-\frac{3}{2}} = -\frac{1}{2(\sqrt{x})^3}$$

$$\frac{1}{\sqrt{7}} \approx f(9) + f'(9)(7-9)$$

$$= \frac{1}{\sqrt{9}} + \left(-\frac{1}{2(\sqrt{9})^3}\right)(-x^2)$$

$$= \frac{1}{3} + \frac{1}{3^2} = \frac{1}{3} + \frac{1}{27} = \frac{9+1}{27}$$

$$= \frac{10}{93}$$

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2. Use a differential (or the tangent line zipprbximation method) to approximate y=%

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3. Let $f(x)$	a's name: D1 – Lacy Hardcastle $1 = \frac{x^2 - 9}{x - 1}.$ Find the domain of f .	D2-Kyla (Hewell) Adams D3-Kelly Robinson reter is not equal to zero.
(6 pts.)	x / + 1 Find the x-intercepts and y-intercept	t of f.
(10 pts.)	$\frac{x - int}{x^2 - 9} = 0$ $\frac{x^2 - 9}{x^2 - 9} = 0$ $\frac{x^2 - 9}{x^2 - 9} = 0$ $\frac{x^2 - 9}{x^2 - 9} = 0$	1 / . #
(10 pts.)	The vertical ass Set the denomina $\frac{ x }{ x } = \frac{1}{ x }$ lim $\frac{ x ^2 - 9}{ x ^2 + 1}$ DNB $\frac{ x }{ x } = \frac{1}{ x }$	ater = 0
	There is no his because lim &	onizontal asymptote $\frac{(^{2}-9)}{x-1} = \lim_{x \to \infty} \frac{x(x-\frac{9}{x})}{x(1-\frac{1}{x})} = \infty$
	(-1) X^{2} -9 Θ_{X}^{2} Θ_{X} $\overline{\Theta}_{1}^{9}$	The oblique asymptote is $y = x + 1$.

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(c) Find all asymptotes of f



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The management of Hotlanta Hot Sauce Company estimate that their profit (in dollars) from the daily production and sale of x boxes (each box consisting of a dozen bottles) of the hot sauce is given by $P(x) = -0.000001x^3 + 27x - 8000$. How many bottles of hot sauce does the company have to produce and sell to make the largest daily profit?

P(x) = (-0,000001)(3x2)+27 = 0 $(-0.000001) 3x^{2} = -27$ $x^{2} = \frac{-27}{-(.000001)3} = 9000000$

P(x) = (-0.000001) (6x) (15 pts.) P'(3000) = -0.000001 (6.3000) <07 Hot lank Hot sauce componey has to sell [36,000] bottles a day to make the largest daily profit.

(10 pts.)

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4. The management of Hotlanta Hot Sauce Company estimate that their profit (in dollars) from the daily production and sale of x boxes (each box consisting of a dozen bottles) of the hot sauce is given by $P(x) = -0.000001x3\ 27x - 8000$. How many bottles of hot sauce does the company have to_produce and sell to make the largest daily profit?

pfx):)(M1) 1.». 6 (I II

Page 4 of 4 Version A March 4, 2009 Circle your TA's name: D1 – Lacy Hardcastle D2 – Kyla (Hewell) Adams D3 – Kelly Robinson 6. Determine whether each statement is true or false. Justify the answers.	MATH 1712 D1-D3	Test #2	Full Name_	Key	1 - 1 12 - 14	10 21 ²³
6. Determine whether each statement is true or false. Justify the answers. (a) If $f'(c) = 0$, then f has a relative maximum or a relative minimum at $x = c$. False (6 pts.) (a) If $f'(c) = 0$, then f has a relative maximum or a relative minimum at $x = c$. (b) False (c) False (d) False (e) False (f(x)) = 3x (f(x))	Page 4 of 4	Version A		12.1111)	March 4, 2009	
(a) If $f'(c) = 0$, then f has a relative maximum or a relative minimum at $x = c$. False (6 pts.) (a) If $f'(c) = 0$, then f has a relative maximum or a relative minimum at $x = c$. (b) $f(x) = 0$ (c) $f(x) = 0$ (d) $f(x) = 0$ (e) $f(x) = 0$ (formall $f'(c) = 0$), the second derivative test fails. True (formall $f'(c) = 0$) (formall $f'(c) = 0$), the second derivative test fails. The sign graphs of f , $f'(c) = 0$, the second derivative test fails. The sign graphs of f , $f'(c) = 0$, the second derivative test fails. The sign graphs of f , $f'(c) = 0$, the second derivative test fails. The sign graphs of f , $f'(c) = 0$, the second derivative test fails. The sign graphs of $f'(c) = 0$, the second derivative test fails. The sign graphs of $f'(c) = 0$, the second derivative test fails. The sign graphs of $f'(c) = 0$, the second derivative test fails. The sign graphs of $f'(c) = 0$, the second derivative test fails. The sign graphs of $f'(c) = 0$, the second derivative test fails. The sign graphs of $f'(c) = 0$, the second derivative test fails. The sign graphs of $f'(c) = 0$, the second derivative test fails.	Circle your TA's name	e: D1 - Lacy Hard	deastle D2 - K	yla (Hewell) Adams	D3 - Kelly Rob	inson
(a) If $f'(c) = 0$, then f has a relative maximum or a relative minimum at $x = c$. False (6 pts.) (a) If $f'(c) = 0$, then f has a relative maximum or a relative minimum at $x = c$. (b) False (c) False (d) False (e) False (f(x)) = 3x (f(6. Determine wheth	ner each statement	is true or false.	Justify the answers.		
(a) If $f'(c) = 0$ and $f''(c) = 0$, the second derivative test fails. True (b) See the rule (30) on $f''(c) = 0$. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$, the second derivative test fails. The sign graphs of $f''(c) = 0$ and $f'''(c) = 0$, the second derivative test fails.	15.0.				$ \begin{array}{c} \text{m at } x = c. \\ \uparrow & \downarrow \uparrow \end{array} $	2=23
True See the rule (3e) on p. 274. The sign graphs of f, f' and f''. Sketch a plausible graph of the function f.	(6 pts.) a co	interexa	ypte	-	Kni	7
The sign graphs of f, f, and f.". Sketch a plausible graph of the function f.	(a) $If f'(c) =$	$\begin{cases} f(x) = 3x \\ 0 \text{ and } f'(c) = 0, \end{cases}$	the second deriv	ative test fails.	/ nei	thar H
7. The sign graphs of f, f' and f''. Sketch a plausible graph of the function f.	True	<u> </u>			n	is.
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