MATH 100-D200 Instructor: R. Pyke

Midterm 1, *Version 1*, October 2, 2008

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1. DO NOT LIFT UP THE COVER PAGE UNTIL INSTRUCTED.
2. Clearly explain your answer. No credit will be given for just writing down the answer.
3. If the answer space provided is not sufficient, write your answer on the back of the previous page.
4. Ordinary Scientific Calculators ONLY are allowed.
   NO GRAPHING CALCULATORS ALLOWED.
5. **Copying someone else's test, or deliberately exposing written papers to the view of others is forbidden and will result in a score of zero and disciplinary action.**

Question	Score	Max
1		9
2		4
3		4
4		4
5		5
6		6
7		3
8		3
Total		38

(1) [Marks: 9] Solve the following inequalities. Express your answer in interval notation.

(a) $\dfrac{x(x-1)}{x+5} \geq 0$

(b) $|2x-7| < 1$

(c) $2x+1 \leq \dfrac{x-4}{-3} < 7+3x$

(2) [Marks: 4] Find the centre and radius of the following circle. Also, find all intercepts (x and y) if there are any.

$$-12x - 12 - 3x^2 + 12y - 3y^2 = -6$$

(3) [Marks: 4] Find the equation of the circle such that the points $A(\frac{2}{3}, -2)$ and $B(2, \frac{7}{2})$ lie on opposite sides of the circle. Express your answer in standard form.

(4) [Marks: 4] Determine whether the graphs of the following functions are even, odd, or neither.

(a) $y = 3x - \dfrac{2}{x^{1/3}}$

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

(5) [Marks:5] Find the domain of the following function. Express your answer in interval notation.

$$f(x) = \frac{\sqrt{12 - 2x - 2x^2}}{2x^3 + 16}$$

(6) [Marks: 6] Find the following limits by simplifying the expression first.

(a) $\lim_{t \to -1} \dfrac{t^3 + 3t^2 + 3t + 1}{t^4 + t^3 + t + 1}$

(b) $\lim_{h \to 0} \dfrac{1}{h}\left[1 - \dfrac{1}{\sqrt{1+h}}\right]$

(7) [Marks:3] Find the equation of the line that is parallel to the line $3y - 2x + 5 = 0$ and passes through the point $(7, -2)$.

(8) [Marks: 3] Determine a slope m of the line $y = mx - 3$ so that it touches the parabola $y = 3x^2 - 2x + 1$ in just one point (hint: this point is a point of intersection).