Early Exam
MAT 125 and MAT 131

February 8, 2006, 8:30 – 10 pm

Name:_____ ID number: _____

Recitation number (e.g., R01):_____ Score: _____
(for evening lecture, use "ELC 4")

Lecture 1	MWF 9:35–10:30	Stephen Preston
R01	MW 11:45am–12:40pm	Yinghua Li
R02	TuTh 3:50pm– 4:45pm	Bryan Kim
R03	TuTh 12:50pm–2:10pm	Ariel Hitron
Evening Lec 4	TuTh 5:20pm–7:10pm	Wenchuan Hu

Instructions. Answer each question by circling the correct answer. You have ninety minutes to complete this exam. No notes, books, or calculators.

Do not open the exam until instructed by proctor!

1. The equation of the straight line through the points $(-1, 3)$ and $(2, -3)$ is

   (a) $y - 1 = 2x$;
   (b) $y + 1 = 2x$;
   (c) $y = 5 - 2x$;
   (d) $y = 1 - 2x$;
   (e) none of the above.

2. The equation of the straight line through point $(1, 1)$ parallel to line $y = 3x - 1$ is

   (a) $y = x$
   (b) $y = 3x$
   (c) $y = -\frac{1}{3}x + 1$
   (d) $y = -\frac{1}{3}x - 1$
   (e) none of the above.

3. The set of all solutions to the inequality $x^2 - 4x + 3 > 0$ is

   (a) $(-1, 3)$
   (b) $(1, 3)$
   (c) $(-\infty, 1) \cup (3, \infty)$
   (d) $(-\infty, -1) \cup (3, \infty)$
   (e) none of the above.

4. $\dfrac{2^{2x}3^{x+1}}{6^{x+1}}$ is equal to

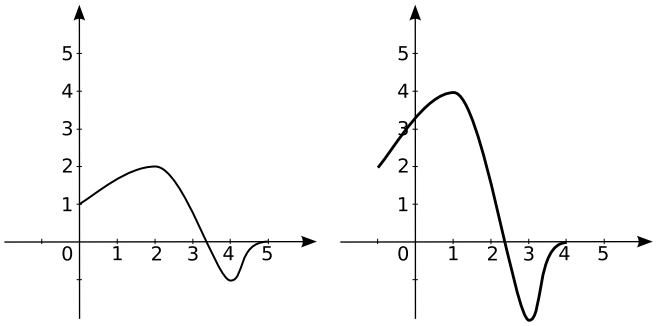
   (a) 2^{x+1}
   (b) 2^{x-1}
   (c) $\left(\frac{2}{3}\right)^{x-1}$
   (d) 2^{2x-1}
   (e) none of the above.

5. After simplification, expression $\dfrac{(ab)^3 a^{-2}}{\sqrt{ab}}$ is equal to

   (a) $\sqrt{ab^3}$
   (b) $a^{1/2}b^{5/2}$
   (c) $\dfrac{ab^2}{\sqrt{a}}$
   (d) $(\sqrt{a})^3 b^3$
   (e) none of the above.

6. If $a = \frac{2}{x-1}$, $b = \frac{2}{x+1}$, then $\dfrac{1}{a} - \dfrac{1}{b}$ is equal to

   (a) $\frac{2}{(x-1)(x+1)}$
   (b) $\frac{-4}{(x-1)(x+1)}$
   (c) -1
   (d) $\frac{x}{2}$
   (e) none of the above.

7. 

   (a) (b)

   Figure (a) shows the graph of function $f(x)$. Then the graph in Figure (b) is the graph of

   (a) $f(2(x+1))$
   (b) $2f(x+1)$
   (c) $2f(x-1)$
   (d) $f(\frac{1}{2}(x-1))$
   (e) none of the above.

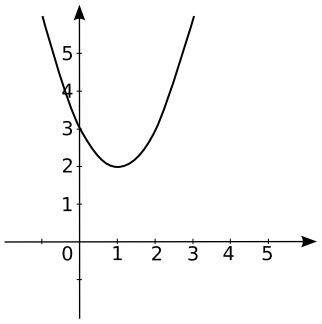
8. Function $f(x) = \cos(2x) + 2x^2$ is

   (a) even but not odd
   (b) odd but not even
   (c) both even and odd
   (d) neither even nor odd

9. The function $f(x) = x^2 - 2x$ has

   (a) minimum at $x = 1$
   (b) maximum at $x = 1$
   (c) minimum at $x = 0$
   (d) maximum at $x = -1$
   (e) none of the above.

10. The figure below is the graph of the function



   (a) $f(x) = (x-1)^2 + 2$
   (b) $f(x) = (x+1)^2 + 2$
   (c) $f(x) = (x+2)^2 + 1$
   (d) $f(x) = 2(x+1)^2 + 1$

11. If $0 < \theta < \pi/2$ and $\sin\theta = \frac{\sqrt{3}}{2}$, then $\tan\theta$ is equal to

   (a) $\frac{1}{2}$
   (b) $\frac{1}{3}$
   (c) $\frac{1}{\sqrt{3}}$
   (d) $\sqrt{3}$
   (e) none of the above.

12. The set of solutions of inequality $2^{-x} < 4$ is

    (a) $x < 2$
    (b) $x > 2$
    (c) $x > -2$
    (d) $x < -2$
    (e) none of the above.

13. Solution of the equation $9^x \cdot 27 = \left(\frac{1}{3}\right)^x$ is

    (a) $x = 0$
    (b) $x = 1$
    (c) $x = -1$
    (d) $x = \frac{1}{2}$
    (e) none of the above.

14. If $x = \log_3 5$, then $9^{(1-x)}$ is equal to

    (a) $3^2 - 5^2$
    (b) $3^2 \cdot 5^2$
    (c) $\frac{9}{25}$
    (d) $3^{(2-x)}$
    (e) none of the above.

15. If $f(x) = 2x + 1$, $g(x) = 2 - \sin(x)$, then $f \circ g(x) =$

    (a) $2 - \sin(2x + 1)$
    (b) $3 - 2\sin(x)$
    (c) $3 - \sin(2x)$
    (d) $6 - 2\sin(x))$
    (e) none of the above.

16. If $f(g(x)) = sin^2(e^x)$ and $f(x) = x^2$, then $g(x)$ is

    (a) $\sin^2(e^{\sqrt{x}})$
    (b) $\sin(x^2)$
    (c) $e^{\sin^2(x)}$
    (d) $\sin(e^x)$
    (e) none of the above.