

## Calculus Early Exam February 5, 2003

Instructions: The exam consists of 15 multiple choice questions. You have 90 minutes to answer all fifteen questions. Be sure to record your answers on the opscan form. You are not allowed to use any books, notes, or calculators. Good luck.

1. Find the equation of the line parallel to  $y = 3x + 1$  and passing through the point  $(2, 2)$ .

- a.  $y = x$       b.  $y = 3x + 2$       c.  $y = 3x - 4$       d.  $y = 2x + 1$   
e. none of the above

2. Simplify  $\frac{2^{3x}}{8^{x+1}}$ .

- a.  $\frac{1}{2}$       b.  $\frac{1}{4}$       c.  $\frac{1}{8}$       d.  $\frac{2^{2x+1}}{8^x}$       e. none of the above

3. Given the following table of values for  $f(x)$  and  $g(x)$ , find  $(f \circ g)(2)$ .

$x$	0	1	2	3	4
$f(x)$	2	4	3	1	0
$g(x)$	3	2	1	0	1

- a. 0      b. 1      c. 2      d. 4      e. none of the above

4. Which of the following is a formula for an exponential function whose graph passes through the points  $(0, 4)$  and  $(2, 36)$

- a.  $4(3^x)$       b.  $9^x$       c.  $12^x$       d.  $16x + 4$       e. none of the above

5. What is the range of  $h(x) = x^2 + 4x + 1$ ?

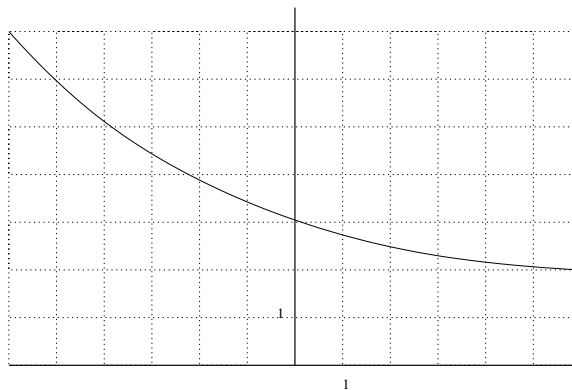
- a.  $x \geq -3$       b.  $x \geq 1$       c.  $x \geq 4$       d. all real numbers  
e. none of the above

The right answer of this exercise is a but since it is a notation that may have not be emphasized on these classes, and some students got confused about calling the range variable with x instead of y, IF the score of this exercise makes any change in the final grade we will accept BOTH answers (a , and e) as correct.

6. Which of the following functions is even?

- a.  $2x^2 + 4x$        b.  $x^4 + 3x^2$       c.  $\sin(x)$       d.  $2^x$   
e. none of the above

7. The following is the graph of  $f(x) = a^x + 2$ . Which of the following statements are true?



- a.  $a$  is negative      b.  $a$  is an integer      c.  $a > 1$        d.  $a < 1$   
e. none of the above

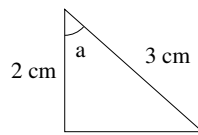
8. Solve the inequality  $|5x + 2| < 0$ .

- a.  $x < -\frac{2}{5}$       b.  $x > \frac{2}{5}$       c.  $2 < x < 5$       d.  $x < 0$   
 e. there is no solution

9. If  $f(x) = x^6 + x$  and  $g(x) = \sqrt{x}$ , then  $(f \circ g)(x)$  equals

- a.  $\sqrt{x^6 + x}$     b.  $x^6 + \sqrt{x}$     c.  $x^{5/2} + x^{1/2}$      d.  $x^3 + \sqrt{x}$   
e. none of the above

10. If  $a$  is the angle below, find  $\sin a$ .



- a.  $-\frac{\sqrt{5}}{3}$     b.  $\frac{2}{3}$      c.  $\frac{\sqrt{5}}{3}$     d. 3    e. none of the above

11. What is the  $y$ -intercept of the line  $y - 3 = a(x - 1)$  ?

- a. 1    b. 3    c.  $a$      d.  $3 - a$     e. none of the above

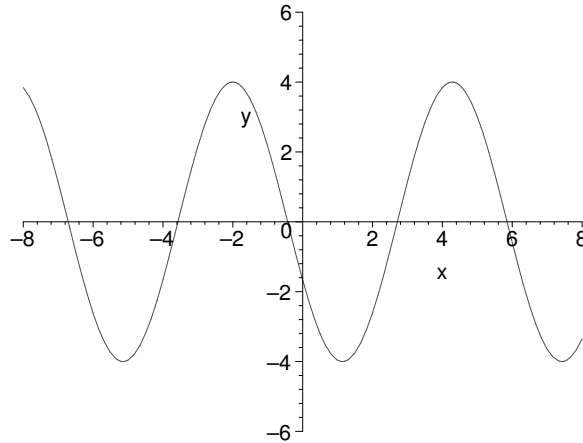
12. Find all the solutions to the equation  $\sin^2 x + \sin x = 0$  in the interval  $[0, 2\pi]$ .

- a.  $0, \pi/2, \pi, 2\pi$   
 b.  $0, \pi, 3\pi/2, 2\pi$   
c.  $0, \pi/2, \pi, 3\pi/2, 2\pi$   
d.  $0, \pi/2$   
e. none of the above

13. Solve the inequality  $x^2 - 2x < 3$ .

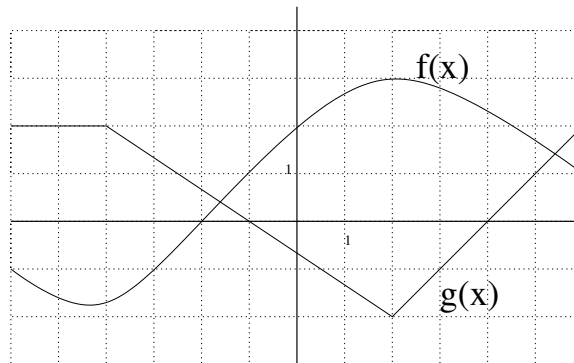
- a.  $-1 < x < 3$       b.  $(-\infty, -1) \cup (3, \infty)$       c.  $[2, 3]$       d.  $x < 0$   
 e. none of the above

14. The following is the graph of  $A \cos(x + B)$ . What are the values of  $A$  and  $B$ ?



- a.  $A = \pi, B = \pi/2$       b.  $A = 3, B = \pi/2$       c.  $A = 4, B = 2$   
 d.  $A = 4, B = \pi$       e. none of the above

15. The graphs of  $f(x)$  and  $g(x)$  are given below. What is  $(f + 3g)(2)$ ?



- a. 3      b. -3      c. 2      d. -2      e. none of the above