MA 15300 Exam 3, Form 01 Fall 2015

Name: _____

Instructions:

1. Fill in your name above.

2. You must use a #2 pencil on the answer sheet.

3. On the answer sheet:
   a. Fill in your last name, first name and middle initial **and** blacken the appropriate spaces.
   b. Fill in your student identification number **and** blacken the appropriate spaces; **THIS IS THE 10-DIGIT NUMBER PRINTED ON YOUR STUDENT ID.**
   c. Fill in your section number **and** blacken the appropriate spaces; **THIS IS AVAIABLE IN THE TABLE BELOW**
   d. Fill in your test/quiz number from above (01)
   e. Sign your name

4. Make sure that the cover of this exam matches the color of your answer sheet. If you are color blind, ask the person sitting next to you for assistance.

5. There are 15 questions on the exam. On the answer sheet, blacken your choice of the correct answer in the spaces provided for questions 1 – 15. Do all of your work on the question sheet. Turn in the answer sheet when you leave and keep the question sheet. **Only the answer sheet will be graded.**

6. All questions are worth the same. **Please answer every question**. There is no penalty for guessing.

7. A TI-30Xa scientific calculator is the ONLY calculator that may be used on the exam. **No other calculators are allowed. Cell phones, iPods, books, and scrap paper are also NOT allowed.**

8. The exam is self-explanatory. Do **NOT** ask any questions about any of the exam problems.

9. When you are finished, you will need to take your answer sheet and your student ID to the proctor to submit your work and have your answer sheet and student ID inspected.

Class Time	Instructor	Section #		Class Time	Instructor	Section #
MWF 7:30	Lindsey Hill	**0041**		MWF 11:30	Theodore Stueve	**0101**
MWF 8:30	Jenna Beckley	**0024**		MWF 1:30	Dan Oprea	**0073**
MWF 8:30	Lindsey Hill	**0083**		MWF 2:30	Steve Grenat	**0033**
MWF 8:30	Mary Ritter	**0096**		MWF 2:30	Joshua Goodwin	**0098**
MWF 9:30	Vivek Mukundan	**0015**		MWF 3:30	Carolyn Henry	**0063**
MWF 9:30	Raika Sina	**0062**		MWF 3:30	Vianney Filos-Gonzalez	**0064**
MWF 9:30	Rachel Aker	**0093**		MWF 3:30	Steve Grenat	**0072**
MWF 10:30	Vivek Mukundan	**0021**		MWR 4:30	Steve Painter	**0023**
MWF 10:30	Nicholas Montan	**0092**		MWR 4:30	Carolyn Henry	**0095**
MWF 10:30	Jennifer Losby	**0099**		MWF 4:30	Patrick Devlin	**0065**
MWF 11:30	Herbert Cruz	**0100**		ONLINE	Patrick Devlin	**9999**

1. Find the standard form of a quadratic function that has a vertex of $(3, 5)$ and an y-intercept of -2.

A. $f(x) = \frac{7}{9}(x+3)^2 - 5$

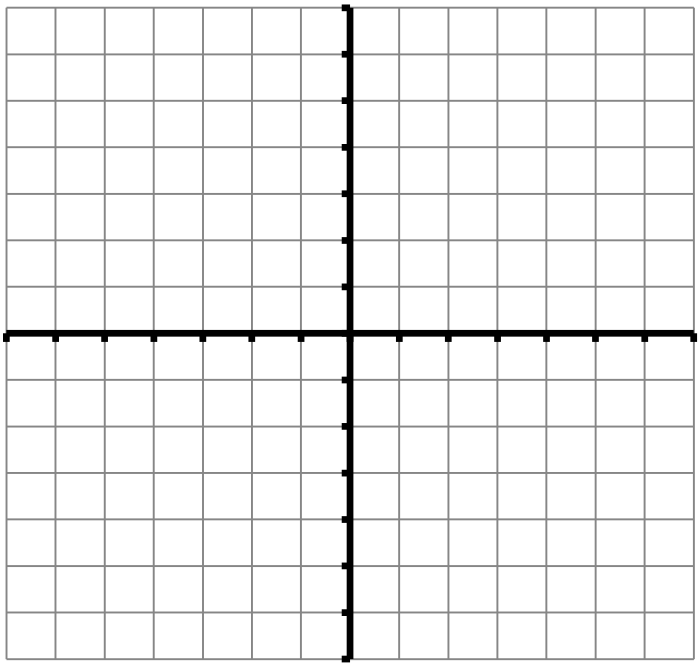
B. $f(x) = \frac{1}{3}(x-3)^2 + 5$

C. $f(x) = -\frac{1}{5}(x-3)^2 + 5$

D. $f(x) = -\frac{1}{3}(x+3)^2 - 5$

E. $f(x) = -\frac{7}{9}(x-3)^2 + 5$

2. Given the quadratic function $f(x) = \frac{1}{2}(x+6)(x-2)$, determine which of the following statements is/are true.



I.	The y-intercept of the function is $(0, -6)$
II.	The domain of the function is $[-8, \infty)$
III.	The function f is decreasing on the interval $(-\infty, -2)$

A. I only

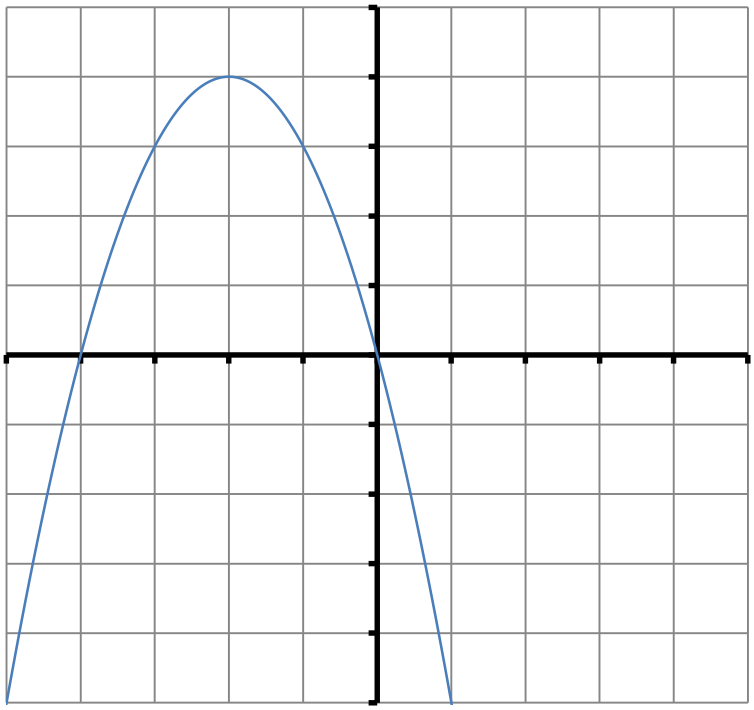
B. II only

C. III only

D. I and III only

E. I, II, and III are all true

3. Find the standard form of the quadratic function represented by the graph provided below. (each tick mark represents 1 unit)



A. $f(x) = (-x-2)^2 - 4$

B. $f(x) = (x-2)^2 - 4$

C. $f(x) = -(x+2)^2 + 4$

D. $f(x) = (x+4)^2 - 2$

E. $f(x) = -(x-4)^2 + 2$

4. Which of the following function values is correct for the piecewise-defined function f given below?

$$f(x) = \begin{cases} 2(x-3)^2 - 2 & if \quad x < 1 \\ \sqrt{x-1} & if \quad 1 \le x \le 5 \\ \dfrac{8}{x} & if \quad x > 5 \end{cases}$$

A. $f(1) = 6$

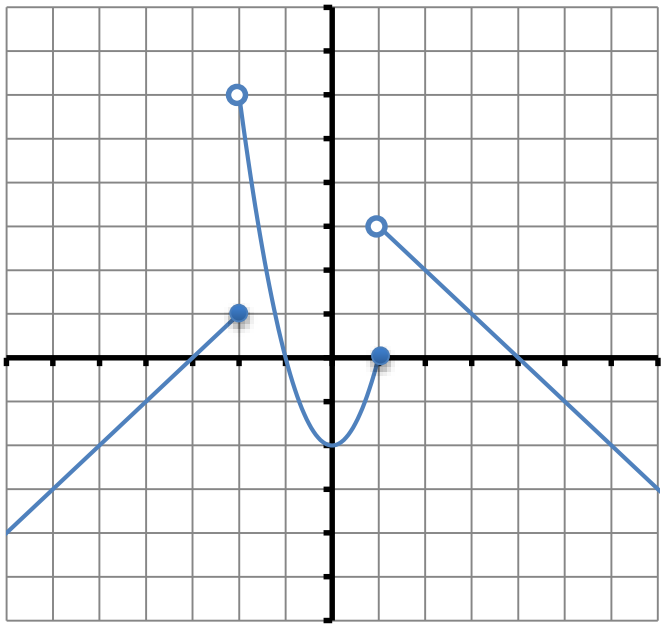
B. $f(5) = \frac{8}{5}$

C. $f(2) = 1$

D. $f(-3) = -74$

E. $f(0)$ is undefined

5. Given the graph of the piecewise-defined function f, determine which of the following statements is/are true. (assume each tick mark represents one unit)



I.	f is increasing on the intervals $(-\infty, -2] \cup (0, 1]$
II.	f has four total intercepts
III.	$f(x) = 0$ when $x = -2$

A. I only

B. II only

C. III only

D. I, II, and III are all true

E. I, II, and III are all false

6. A certain country taxes the first \$50,000 of an individual's income at a rate of 10%, and all income over \$50,000 is taxed at 25%. Choose the piecewise-defined function T that specifies the total tax on an income of x dollars.

A. $T(x) = \begin{cases} 0.1 & if \ 0 \le x \le 50{,}000 \\ 0.25 & if \ x > 50{,}000 \end{cases}$

B. $T(x) = \begin{cases} 0.1x & if \ 0 \le x \le 50{,}000 \\ 0.25x & if \ x > 50{,}000 \end{cases}$

C. $T(x) = \begin{cases} 0.1x & if \ 0 \le x \le 50{,}000 \\ 0.25x + 5{,}000 & if \ x > 50{,}000 \end{cases}$

D. $T(x) = \begin{cases} 0.1x & if \ 0 \le x \le 50{,}000 \\ 0.25x - 12{,}500 & if \ x > 50{,}000 \end{cases}$

E. $T(x) = \begin{cases} 0.1x & if \ 0 \le x \le 50{,}000 \\ 0.25x - 7{,}500 & if \ x > 50{,}000 \end{cases}$

7. Which of the following is the inverse of the function $f(x) = \frac{-2x+9}{10+3x}$?

A. $f^{-1}(x) = \frac{9-10x}{3x+2}$

B. $f^{-1}(x) = \frac{3(3-x)}{2(5x+1)}$

C. $f^{-1}(x) = \frac{-2-3x}{10x-9}$

D. $f^{-1}(x) = \frac{-2(1+5x)}{3(x-3)}$

E. $f^{-1}(x) = \frac{10+3x}{-2x+9}$

8. Which of the following is the range of the function $f(x) = \frac{1}{2}(5-x)^2 + 3$, where $x \leq 5$?

A. $(-\infty, 5]$

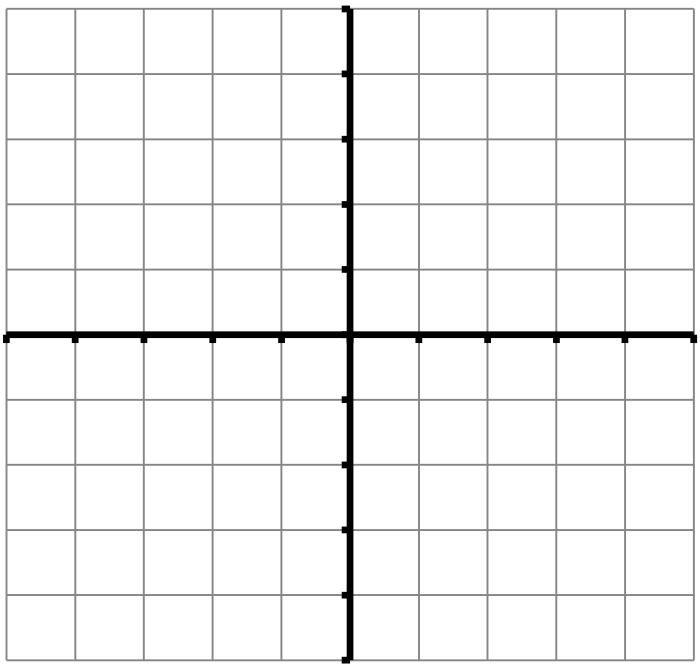
B. $(-\infty, 3]$

C. $[3, \infty)$

D. $[5, \infty)$

E. $(-\infty, \infty)$

9. Which of the following statements is/are true about the graph of the function $f(x) = 2^x - 4$?



I. $f(x) \neq 0$

II. The y-intercept of the function is $(0, -4)$

III. $f(x)$ is always positive

A. I and II only

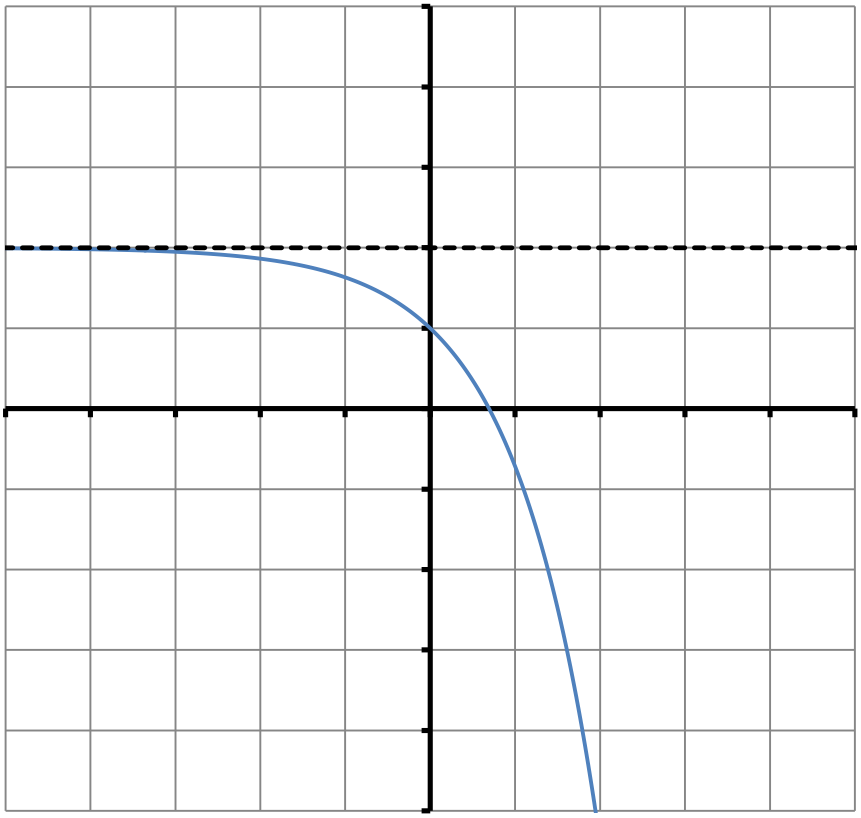
B. I and III only

C. II and III only

D. I, II, and III are all true

E. I, II, and III are all false

10. Given below is the graph of which of the following functions? (each tick mark represents one unit on the graph)



A. $f(x) = e^x - 2$

B. $g(x) = e^{-x} + 2$

C. $h(x) = e^{-x} - 2$

D. $j(x) = -e^x + 2$

E. $k(x) = -e^x - 2$

11. Find an exponential function $f(x) = b \cdot a^x$ that passes through the point $\left(\frac{1}{2}, -14\right)$ and has a y-intercept of -2.

A. $f(x) = -2 \cdot (49)^x$

B. $f(x) = 2 \cdot (-7)^x$

C. $f(x) = -2 \cdot (7)^x$

D. $f(x) = 2 \cdot \left(\frac{1}{49}\right)^x$

E. None of the above

12. A proposed alternative to the current Social Security system is to set-up an account with \$10,000 for every child born in the United States to parents who are U.S. citizens. The account would be payable on a person's 68th birthday. Calculate the amount a person would receive if the average annual interest rate is 4.25% compounded continuously. Use either $A = Pe^{rt}$ or $A = P\left(1 + \frac{r}{n}\right)^{nt}$ and round to the nearest penny.

A. \$179,933.10

B. \$179,016.76

C. \$174,566.72

D. \$35,572,183,748,640,200.00

E. \$21,575,631,098,794,700.00

13. Which of the following answer options contains a logarithmic equation that is correct?

A. $\log_9(3) = 2$

B. $\log_5(2) = 10$

C. $\log_4(16) = \frac{1}{2}$

D. $\log_6(0) = 1$

E. None of the above

14. Which of the following logarithmic functions has an unrestricted domain?

A. $\log_2(x^2)$

B. $\log_2(x)$

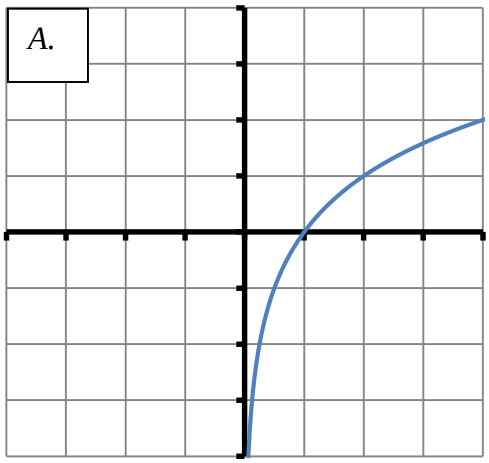
C. $\log_2(1+x)$

D. $\log_2(x^2+1)$

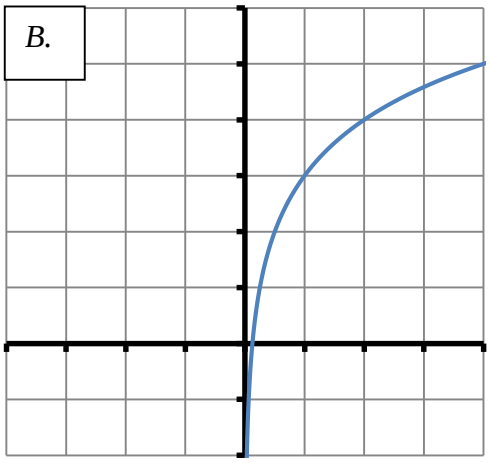
E. $\log_2\left(\frac{1}{x^2}\right)$

15. Which of the following graphs most closely resembles the graph of $y = \log_2(x+3)$?

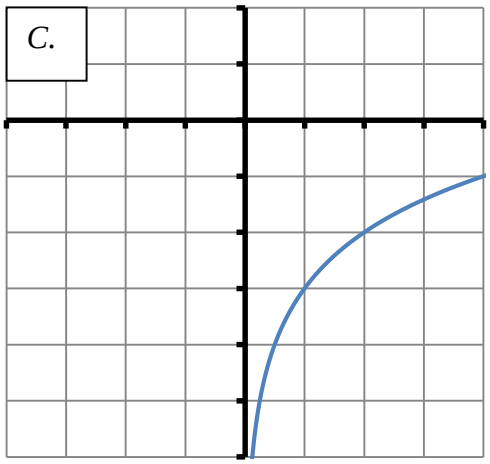
A.



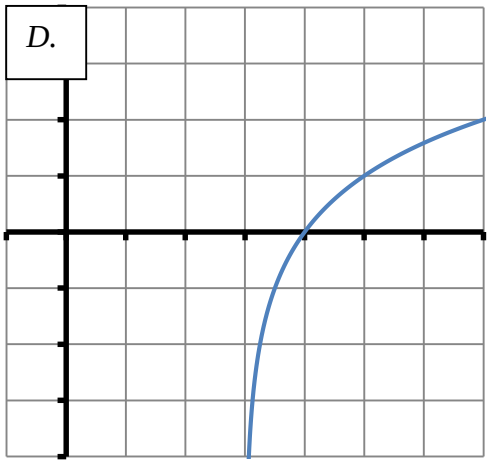
B.



C.



D.



E.