Academic Honesty Statement

By signing this form, I acknowledge that I understand each of the behaviors listed below to be a form of academic dishonesty (cheating). I am also pledging not to engage in any of these behaviors. I understand that if I do engage in these behaviors, the consequences will be failure of the exam and a formal charge of academic dishonesty to the Provost.

- using a calculator
- using a cell phone, watch, or any other communication technology
- referring to a piece of paper or object with helpful information on it (cheat sheet, crib sheet, bill of a baseball cap, etc...)
- looking at a test or answer sheet that is not my own
- allowing another student to look at my test or answer sheet
- communicating with other students (verbally or nonverbally)
- taking the test for another student
- talking or turning on a phone or music device before completely leaving the room

Print Name (neatly, please!): ____

Spire ID: ____

Date: ____

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Please shut off all cell phones, ear phones, computers, beepers, etc. ***Put everything away except a #2 pencil. You <u>cannot</u> use a calculator for this test. You may write on the test. There are 25 multiple choice questions and each question is worth four points.***

1. Write and sign your name at the top of this test.

2. On the bubble sheet, where it says "Name," print your last name, leave a space, and then print your first name in the rectangles. Then fill in the bubbles underneath.

3. On the bubble sheet, where it says "Identification Number," write your entire Student ID number in the rectangles and fill in the bubbles underneath. Please double check to make sure you bubbled in your ID # correctly.

4. On the bubble sheet, where it says "Special Codes," write the numbers: 105232 in the rectangles and fill in the bubbles underneath. Please double check that you bubbled in the special code correctly.

5. On the bubble sheet, in the margin above your name, neatly print: Math102 Exam #1 Fall 2023

Bubble in your answers carefully on the bubble sheet and circle your answers on your test booklet.
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1. Simplify the expression below. Which of the following is the expression in simplest form?

$$\sqrt{(-2)^2} + 5 - 3^2$$

(A) -2
(B) -11
(C) 16
(D) 36

2. Solve the equation below. Which of the following lists contains the answer to the equation?

$$\frac{2 - 4x}{8} = \frac{1}{2}$$

(A) $\{-10, -9, -8, -7, -6, -5, -4, -3, -2, -1\}$

(B) $\left\{0, -\frac{1}{2}, -\frac{1}{3}, -\frac{1}{4}, -\frac{1}{5}, -\frac{1}{6}, -\frac{1}{7}, -\frac{1}{8}, -\frac{1}{9}\right\}$

(C) $\left\{0, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}\right\}$

(D) $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

3. Simplify the expression below. Which of the following is the expression in simplest form?

$$-3x^0 + \sqrt{x^2}$$

(A) $1 + x$
(B) $1 + |x|$
(C) $-3 + x$
(D) $-3 + |x|$

4. Determine the domain of the function $f \circ g(x)$ for the functions below. Which of the following is the domain of $f \circ g(x)$?

$$f(x) = \frac{2x-4}{x-1} \; and \; g(x) = \frac{1}{x-3}$$

(A) $(-\infty, 1) \cup (1,3) \cup (3, \infty)$
(B) $(-\infty, 2) \cup (2,3) \cup (3, \infty)$
(C) $(-\infty, 3) \cup (3,4) \cup (4, \infty)$
(D) None of the above

5. Consider the two functions $f(x)$ and $g(x)$ below. Let $h(x) = (f \circ g)(x)$, the composition of the two functions. Which of the following represents $h(x)$?

$$f(x) = (2x+3)^2 - 5 \text{ and } g(x) = x + 2$$

(A) $h(x) = (2x+7)^2 - 5$
(B) $h(x) = (2x+5)^2 - 5$
(C) $h(x) = (2x+3)^2 - 3$
(D) $h(x) = (2x+3)^2 + x - 3$

6. Which of the following is the equation is NOT a one-to-one function?
   (A) $y = x^2 + 7$
   (B) $y = log_7(x + 2)$
   (C) $y = 2^x + 7$
   (D) $y = \sqrt{x} + 7$

7. Consider the function $f(x)$ below. Which of the following represents the inverse of $f(x)$?

$$f(x) = \frac{3x + 5}{7}$$

   (A) $f^{-1}(x) = \frac{7}{3x+5}$

   (B) $f^{-1}(x) = \frac{7x}{3} - 5$

   (C) $f^{-1}(x) = \frac{3}{7x+5}$

   (D) $f^{-1}(x) = \frac{7x-5}{3}$

8. Which is the domain of the exponential function $f(x) = 2^{x-4}$?
   (A) $[4, \infty)$
   (B) $(0, \infty)$
   (C) $(-\infty, 4]$
   (D) $(-\infty, \infty)$

9. Convert the logarithmic equation below into its equivalent exponential form. Which of the following is equivalent to this logarithmic equation?

$$\log_c b = a$$

(A) $b^a = c$
(B) $c^a = b$
(C) $b^c = a$
(D) $a^c = b$

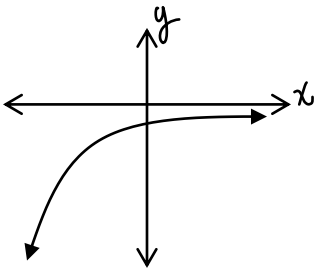
10. Find the exact value of the logarithm below. Which of the following is its exact value?

$$\log_2(16)$$

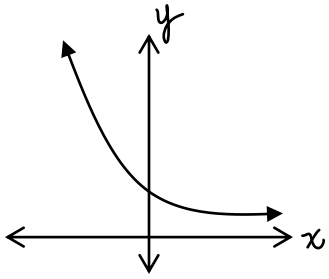
(A) 2
(B) 4
(C) 8
(D) $\frac{1}{8}$

11. Consider the graph of the exponential function $y = 0.7^x$. Which of the following most closely resembles the graph of this function?

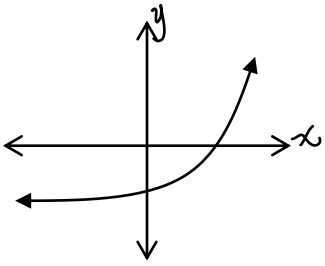
(A)



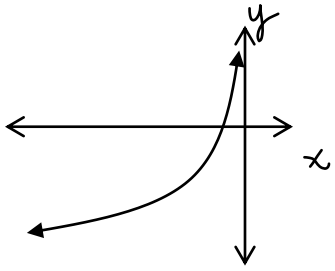
(B)



(C)



(D)



12. Simplify the expression below. Which of the following is equivalent to this expression?

$$log_5 1 + \log 10^2$$

(A) 2
(B) 3
(C) 6
(D) 7

13. Simplify the expression below. Which of the following is equivalent to the expression?

$$\log\left(\frac{1}{1000}\right)$$

(A) -3
(B) $-\frac{1}{3}$
(C) $\frac{1}{3}$
(D) 3

14. Which of the following is an exponential function?

(A) $y = 2x$
(B) $y = x^2$
(C) $y = 2^x$
(D) $y = \sqrt{x}$

15. Solve the equation below. Which of the following lists contains the answer?

$$3^{x+1} = 9$$

(A) $\{-9, -8, -7, -6, -5, -4, -3, -2, -1\}$

(B) $\left\{\frac{1}{2}, \frac{1}{3}, \frac{3}{5}, \frac{2}{7}, \frac{4}{3}, \frac{7}{8}, \frac{1}{6}, \frac{2}{9}, \frac{5}{2}\right\}$

(C) $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

(D) $\left\{-\frac{1}{2}, -\frac{1}{3}, -\frac{3}{5}, -\frac{2}{7}, -\frac{4}{3}, -\frac{7}{8}, -\frac{1}{6}, -\frac{2}{9}, -\frac{5}{2}\right\}$

16. Consider the graph of $y = log_3(2x - 6)$. Which of the following statements is TRUE:

(A) The graph has a vertical asymptote at $x = 6$ and an x-intercept at $x = \frac{7}{2}$

(B) The graph has a vertical asymptote at $x = 3$ and an x-intercept at $x = \frac{7}{2}$

(C) The graph has a vertical asymptote at $x = 6$ and an x-intercept at $x = 3$

(D) The graph has a vertical asymptote at $x = 0$ and an x-intercept at $x = 3$

17. For which set of values of x is the function $f(x) = x^2 + 3$ at one-to-one function?

(A) $(-\infty, \infty)$
(B) $(-\infty, 3]$
(C) $[-3, \infty)$
(D) $[0, \infty)$

18. What is the domain of $f(x) = \sqrt{3x - 12}$?

(A) $[0, \infty)$
(B) $[4, \infty)$
(C) $[-4, \infty)$
(D) $[0,4]$

19. Compute $f \circ g(3)$ where:

$$f(x) = x^2 + 1 \text{ and } g(x) = 2x$$

(A) 19
(B) 20
(C) 37
(D) 49

20. Simplify the product: $a^{7/2} \cdot a^{3/2}$ [Assume a > 0]

(A) $a^{21/4}$
(B) $a^{21/2}$
(C) a^5
(D) None of the above

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