



# Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

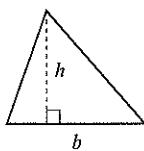
### DIRECTIONS

Questions 1-15 ask you to solve a problem, select the best answer among four choices, and fill in the corresponding circle on your answer sheet. Questions 16-20 ask you to solve a problem and enter your answer in a grid provided on your answer sheet. There are detailed instructions on entering answers into the grid before question 16. You may use your test booklet for scratch work.

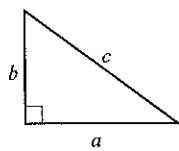
### NOTES

1. You **may not** use a calculator.
2. Variables and expressions represent real numbers unless stated otherwise.
3. Figures are drawn to scale unless stated otherwise.
4. Figures lie in a plane unless stated otherwise.
5. The domain of a function  $f$  is defined as the set of all real numbers  $x$  for which  $f(x)$  is also a real number, unless stated otherwise.

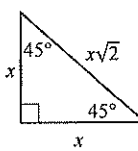
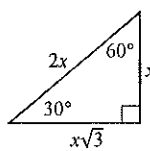
### REFERENCE



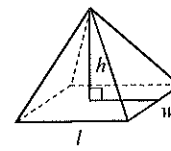
$$A = \frac{1}{2}bh$$



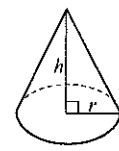
$$a^2 + b^2 = c^2$$



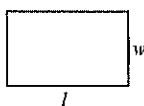
Special Triangles



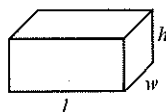
$$V = \frac{1}{3}lwh$$



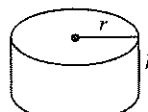
$$V = \frac{1}{3}\pi r^2 h$$



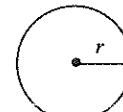
$$A = lw$$



$$V = lwh$$

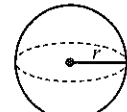


$$V = \pi r^2 h$$



$$A = \pi r^2$$

$$C = 2\pi r$$



$$V = \frac{4}{3}\pi r^3$$

There are  $360^\circ$  in a circle.

The sum of the angles in a triangle is  $180^\circ$ .

The number of radians of arc in a circle is  $2\pi$ .

CONTINUE

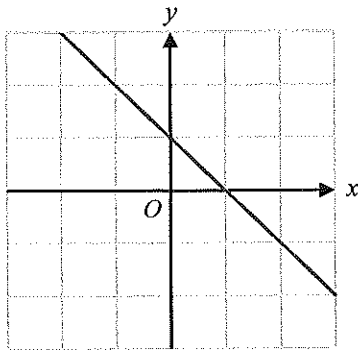


1

If  $p = 5.5$ , what is the value of  $|p| - |1 - p|$ ?

- A) 1.5
- B) 1
- C) 5.5
- D) 9.5

2



Which of the following equations best describes the function in the figure above?

- A)  $y = x + 2$
- B)  $y = x - 2$
- C)  $y = -x + 2$
- D)  $y = -x - 2$

3

If  $(3x + 2)(5x + 1) = ax^2 + bx + 2$ , what is the value of  $a - b$ ?

- A) 2
- B) 8
- C) 22
- D) 28

4

Leo is manufacturing 1 meter rulers. If the ruler differs from the expected length by more than 1 mm, he needs to throw it away. If  $x$  is the length of the ruler in meters, what absolute value inequality represents the rulers that Leo does NOT throw away?

- A)  $|x - 1| \leq 0.01$
- B)  $|x - 1| \leq 0.001$
- C)  $|x - 1| \geq 0.01$
- D)  $|x - 1| \geq 0.001$

5

If  $x^2 = 0.1$ , what is the value of  $x^{-4}$ ?

- A) 1
- B) 10
- C) 100
- D) 1000

CONTINUE

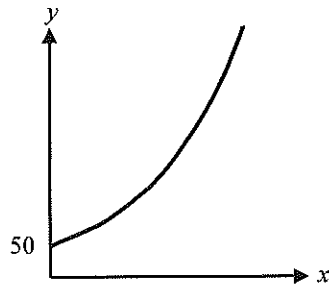


6

If  $4n(n + 8) = 36$ , what is the product of the two solutions to this equation?

- A)  $-12$
- B)  $-9$
- C)  $0$
- D)  $9$

7



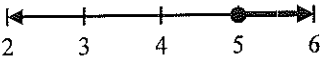
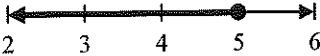


Every year, the population of Dwarf lop rabbits doubles in a certain country, as shown in the graph above. If there were 50 Dwarf lop rabbits last year, how many Dwarf lop rabbits will there be 4 years from now?

- A) 200
- B) 250
- C) 800
- D) 1600

8

Which of the following represents the solution set to the inequality  $2x + 1 \geq 9$ ?

- A) 
- B) 
- C) 
- D) 

9

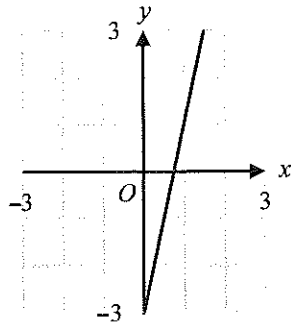
$f(x) = 2x - 1$ , and  $g(x)$  is a linear function that is perpendicular to  $f(x)$ . If  $(0, 4)$  is a point of  $g(x)$ , at what point do  $f(x)$  and  $g(x)$  intersect?

- A)  $(0, -1)$
- B)  $(1, 1)$
- C)  $(2, 3)$
- D)  $(3, 2)$

CONTINUE



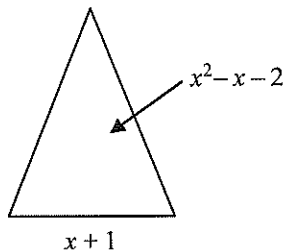
10



The graph shown above represents  $f(x) = 4x - 3$ . If  $f(a + 4) = 5$ , what is the value of  $a$ ?

- A) -2
- B) -1
- C) 1
- D) 4

11



The triangle above has an area of  $x^2 - x - 2$  and a base of  $x + 1$ . What is the height of the triangle?

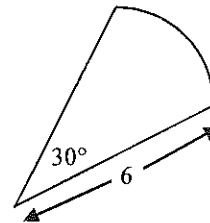
- A)  $\frac{1}{2}(x - 2)$
- B)  $x - 2$
- C)  $2(x - 2)$
- D)  $(x - 2)(x + 1)^2$

12

Which of the following is equal to  $6x^2 - 11x - 7$ ?

- A)  $(6x - 1)(x + 7)$
- B)  $(6x + 1)(x - 7)$
- C)  $(2x - 1)(3x + 7)$
- D)  $(2x + 1)(3x - 7)$

13



Note: figure is not drawn to scale.

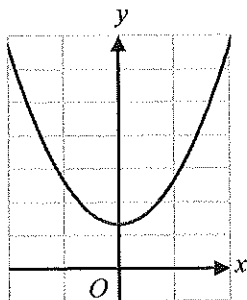
What is the arc length of the figure above?

- A) 180
- B) 90
- C)  $\pi$
- D)  $2\pi$

CONTINUE



14



Which of the following equations could represent an expression for the function in the figure above?

- A)  $f(x) = x^2 + 4$
- B)  $f(x) = x^2 - 4$
- C)  $f(x) = (x - 4)^2$
- D)  $f(x) = (x + 4)^2$

15

Which of the following expressions is equivalent

to  $\frac{15x^2 - 27x - 6}{x - 2}$  ?

- A)  $(5x + 1)$
- B)  $3(5x + 1)$
- C)  $15x^2 - 28x - 4$
- D)  $15x - 35$

CONTINUE


**DIRECTIONS**

Questions 16-20 ask you to solve a problem and enter your answer in the grid provided on your answer sheet. When completing grid-in questions:

- You are required to bubble in the circles for your answers. It is recommended, but not required, that you also write your answer in the boxes above the columns of circles. Points will be awarded based only on whether the circles are filled in correctly.
- Fill in only one circle in a column.
- You can start your answer in any column as long as you can fit in the whole answer.
- For questions 16-20, no answers will be negative numbers.
- Mixed numbers**, such as  $4\frac{2}{5}$ , must be gridded as decimals or improper fractions, such as 4.4 or as  $\frac{22}{5}$ . "42/5" will be read as "forty-two over five," not as "four and two-fifths."
- If your answer is a **decimal** with more digits than will fit on the grid, you may round it or cut it off, but you must fill the entire grid.
- If there are **multiple correct solutions** to a problem, all of them will be considered correct. Enter only **one** on the grid.

5 / 1 1 1	8 . 4	3 / 7
/ ● ○	/ ○ ○	/ ○ ●
. ○ ○ ○ ○	. ○ ○ ● ○	. ○ ○ ○ ○
0 ○ ○ ○ ○	0 ○ ○ ○ ○	0 ○ ○ ○ ○
1 ○ ○ ● ●	1 ○ ○ ○ ○	1 ○ ○ ○ ○
2 ○ ○ ○ ○	2 ○ ○ ○ ○	2 ○ ○ ○ ○
3 ○ ○ ○ ○	3 ○ ○ ○ ○	3 ○ ● ○ ○
4 ○ ○ ○ ○	4 ○ ○ ○ ●	4 ○ ○ ○ ○
5 ● ○ ○ ○	5 ○ ○ ○ ○	5 ○ ○ ○ ○
6 ○ ○ ○ ○	6 ○ ○ ○ ○	6 ○ ○ ○ ○
7 ○ ○ ○ ○	7 ○ ○ ○ ○	7 ○ ○ ○ ●
8 ○ ○ ○ ○	8 ○ ● ○ ○	8 ○ ○ ○ ○
9 ○ ○ ○ ○	9 ○ ○ ○ ○	9 ○ ○ ○ ○

. 4 2 2	. 3 2 6	. 1 2 5
/ ○ ○	/ ○ ○	/ ○ ○
. ● ○ ○ ○	. ● ○ ○ ○	. ● ○ ○ ○
0 ○ ○ ○ ○	0 ○ ○ ○ ○	0 ○ ○ ○ ○
1 ○ ○ ○ ○	1 ○ ○ ○ ○	1 ○ ● ○ ○
2 ○ ○ ● ●	2 ○ ○ ● ○	2 ○ ○ ● ○
3 ○ ○ ○ ○	3 ○ ● ○ ○	3 ○ ○ ○ ○
4 ○ ● ○ ○	4 ○ ○ ○ ○	4 ○ ○ ○ ○
5 ○ ○ ○ ○	5 ○ ○ ○ ○	5 ○ ○ ○ ●
6 ○ ○ ○ ○	6 ○ ○ ○ ●	6 ○ ○ ○ ○
7 ○ ○ ○ ○	7 ○ ○ ○ ○	7 ○ ○ ○ ○
8 ○ ○ ○ ○	8 ○ ○ ○ ○	8 ○ ○ ○ ○
9 ○ ○ ○ ○	9 ○ ○ ○ ○	9 ○ ○ ○ ○

**CONTINUE**



16

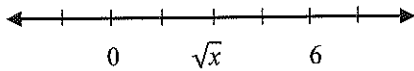
What is a value of  $y$  that satisfies the inequality  $|y - 5| \leq 1$ ?

19

$$\frac{n^2 + 1}{-2n + 8} = -13$$

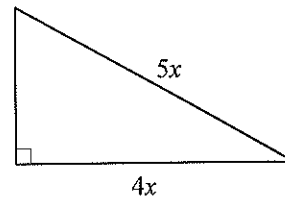
What is a value of  $n$  that satisfies the equation above?

17



What is the value of  $x$  in the number line above?

20



If the perimeter of the above triangle is 72, what is the value of  $x$ ?

18

A psychological research study at a local university pays participants \$15 if they are students and \$10 if they are non-students. If the research study pays 10 participants a total cost of \$120, how many of the participants were students?

# STOP

If you complete this section before the end of your allotted time, check your work on this section only. Do NOT use the time to work on another section.