Math Test – No Calculator

25 MINUTES, 17 QUESTIONS

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

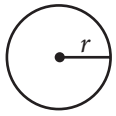
DIRECTIONS

For questions **1-13**, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. For questions **14-17**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 14 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

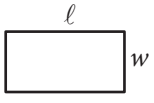
NOTES

1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

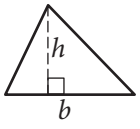
REFERENCE



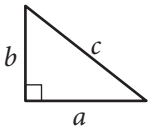
$A = \pi r^2$
$C = 2\pi r$



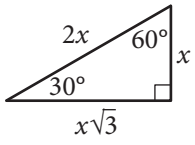
$A = \ell w$

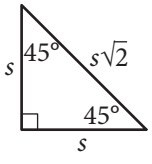


$A = \frac{1}{2}bh$

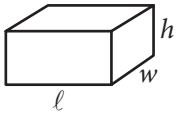


$c^2 = a^2 + b^2$

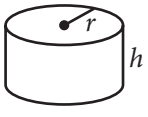




Special Right Triangles

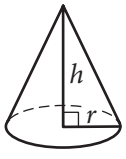


$V = \ell wh$

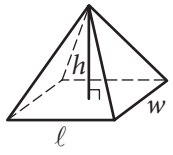


$V = \pi r^2 h$

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



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



$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

CONTINUE

1

A babysitter earns \$8 an hour for babysitting 2 children and an additional \$3 tip when both children are put to bed on time. If the babysitter gets the children to bed on time, what expression could be used to determine how much the babysitter earned?

A) $8x + 3$, where x is the number of hours

B) $3x + 8$, where x is the number of hours

C) $x(8 + 2) + 3$, where x is the number of children

D) $3x + (8 + 2)$, where x is the number of children

2

$$3(x + y) = y$$

If (x, y) is a solution to the equation above and $y \neq 0$, what is the ratio $\frac{x}{y}$?

A) $-\frac{4}{3}$

B) $-\frac{2}{3}$

C) $\frac{1}{3}$

D) $\frac{2}{3}$

3

$$\frac{1}{2}x - \frac{1}{4}y = 10$$
$$\frac{1}{8}x - \frac{1}{8}y = 19$$

Which ordered pair (x, y) satisfies the system of equations above?

A) $(-112, -264)$

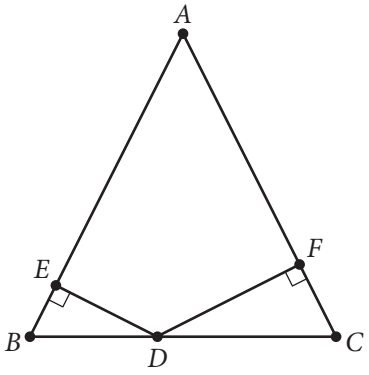
B) $(64, 88)$

C) $\left(\frac{232}{3}, \frac{224}{3}\right)$

D) $(288, 536)$

CONTINUE

4



Note: Figure not drawn to scale.

Triangle ABC above is isosceles with $AB = AC$ and $BC = 48$. The ratio of DE to DF is $5 : 7$. What is the length of $\overline{DC}$?

A) 12

B) 20

C) 24

D) 28

5

In a certain game, a player can solve easy or hard puzzles. A player earns 30 points for solving an easy puzzle and 60 points for solving a hard puzzle. Tina solved a total of 50 puzzles playing this game, earning 1,950 points in all. How many hard puzzles did Tina solve?

A) 10

B) 15

C) 25

D) 35

6

$$2x^2 + 7x - 15 = 0$$

If r and s are two solutions of the equation above and $r > s$, which of the following is the value of $r - s$?

A) $\frac{15}{2}$

B) $\frac{13}{2}$

C) $\frac{11}{2}$

D) $\frac{3}{2}$

7

To cut a lawn, Allan charges a fee of \$15 for his equipment and \$8.50 per hour spent cutting a lawn. Taylor charges a fee of \$12 for his equipment and \$9.25 per hour spent cutting a lawn. If x represents the number of hours spent cutting a lawn, what are all the values of x for which Taylor's total charge is greater than Allan's total charge?

A) $x > 4$

B) $3 \leq x \leq 4$

C) $4 \leq x \leq 5$

D) $x < 3$

CONTINUE

8

$$n = 456 - 3T$$

The equation above is used to model the relationship between the number of cups, n, of hot chocolate sold per day in a coffee shop and the average daily temperature, T, in degrees Fahrenheit. According to the model, what is the meaning of the 3 in the equation?

A) For every increase of 3°F, one more cup of hot chocolate will be sold.

B) For every decrease of 3°F, one more cup of hot chocolate will be sold.

C) For every increase of 1°F, three more cups of hot chocolate will be sold.

D) For every decrease of 1°F, three more cups of hot chocolate will be sold.

9

A truck enters a stretch of road that drops 4 meters in elevation for every 100 meters along the length of the road. The road is at 1,300 meters elevation where the truck entered, and the truck is traveling at 16 meters per second along the road. What is the elevation of the road, in meters, at the point where the truck passes t seconds after entering the road?

A) $1{,}300 - 0.04t$

B) $1{,}300 - 0.64t$

C) $1{,}300 - 4t$

D) $1{,}300 - 16t$

10

If $f(x-1) = 2x + 3$ for all values of x, what is the value of $f(-3)$?

A) -7

B) -5

C) -3

D) -1

11

Which of the following is equivalent to $(s-t)\left(\frac{s}{t}\right)$?

A) $\frac{s}{t} - s$

B) $\frac{s}{t} - st$

C) $\frac{s^2}{t} - s$

D) $\frac{s^2}{t} - \frac{s}{t^2}$

CONTINUE

12

$$p(x) = 3(x^2 + 10x + 5) - 5(x - k)$$

In the polynomial $p(x)$ defined above, k is a constant. If $p(x)$ is divisible by x, what is the value of k ?

A) -3

B) -2

C) 0

D) 3

13

In the xy-plane, if the parabola with equation $y = ax^2 + bx + c$, where a, b, and c are constants, passes through the point $(-1, 1)$, which of the following must be true?

A) $a - b = 1$

B) $-b + c = 1$

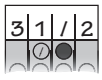
C) $a + b + c = 1$

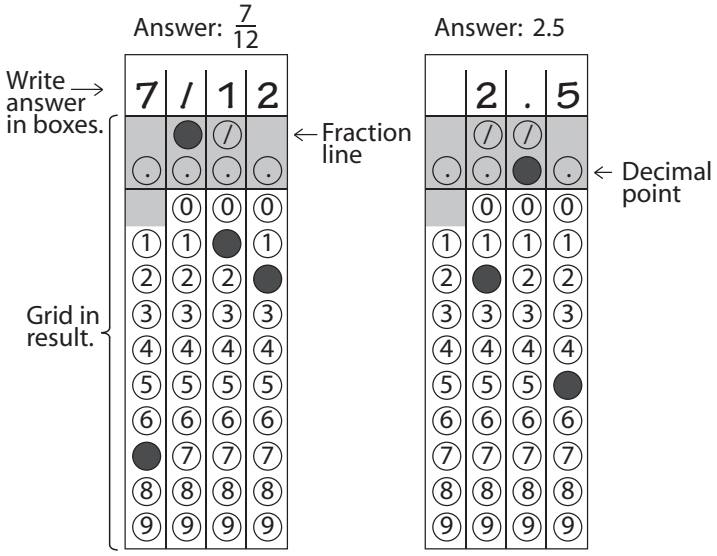
D) $a - b + c = 1$

CONTINUE

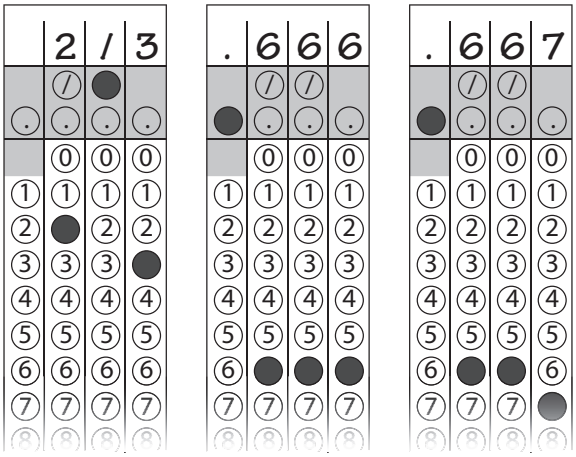
DIRECTIONS

For questions 14–17, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

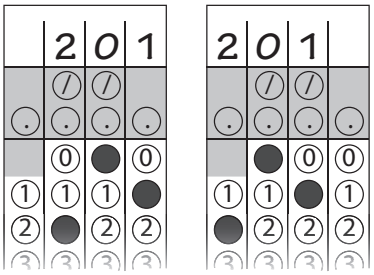
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

14

For what value of h is $24 = \frac{h}{10} - 6$?

15

What is the value of a if $(2a + 3) - (4a - 8) = 7$?

16

If x is not equal to zero, what is the value of $\frac{4(3x)^2}{(2x)^2}$?

17

If $x - 2$ is a factor of $x^2 - bx + b$, where b is a constant, what is the value of b ?

STOP

If you finish before time is called, you may check your work on this section only. Do not turn to any other section.