Math Test – No Calculator

20 MINUTES, 13 QUESTIONS

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

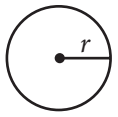
DIRECTIONS

For questions 1-10, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 11-13**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 11 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

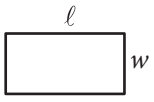
NOTES

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.

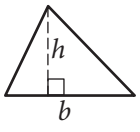
REFERENCE



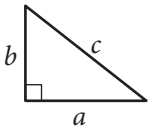
$A = \pi r^2$
$C = 2\pi r$



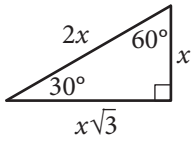
$A = \ell w$

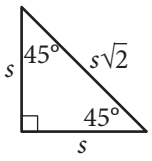


$A = \frac{1}{2}bh$

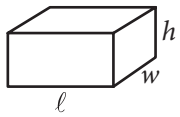


$c^2 = a^2 + b^2$

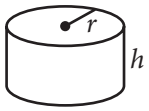




Special Right Triangles

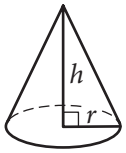


$V = \ell wh$

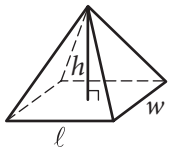


$V = \pi r^2 h$

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



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



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

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.

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CONTINUE

1

$$\frac{3}{4} = \frac{x}{60}$$

In the equation above, what is the value of x ?

A) 25

B) 30

C) 40

D) 45

2

x	y
1	5
2	7
3	9
4	11

The table above shows some pairs of x values and y values. Which of the following equations could represent the relationship between x and y ?

A) $y = 2x + 3$

B) $y = 3x - 2$

C) $y = 4x - 1$

D) $y = 5x$

3

A discount airline sells a certain number of tickets, x, for a flight for \$90 each. It sells the number of remaining tickets, y, for \$250 each. For a particular flight, the airline sold 120 tickets and collected a total of \$27,600 from the sale of those tickets. Which system of equations represents this relationship between x and y?

A) $\begin{cases} x + y = 120 \\ 90x + 250y = 27{,}600 \end{cases}$

B) $\begin{cases} x + y = 120 \\ 90x + 250y = 120(27{,}600) \end{cases}$

C) $\begin{cases} x + y = 27{,}600 \\ 90x + 250y = 120(27{,}600) \end{cases}$

D) $\begin{cases} 90x = 250y \\ 120x + 120y = 27{,}600 \end{cases}$

4

$$x^2 - 17x - 60$$

Which of the following is equivalent to the expression above?

A) $(x - 5)(x - 12)$

B) $(x + 5)(x - 12)$

C) $(x - 3)(x - 20)$

D) $(x + 3)(x - 20)$

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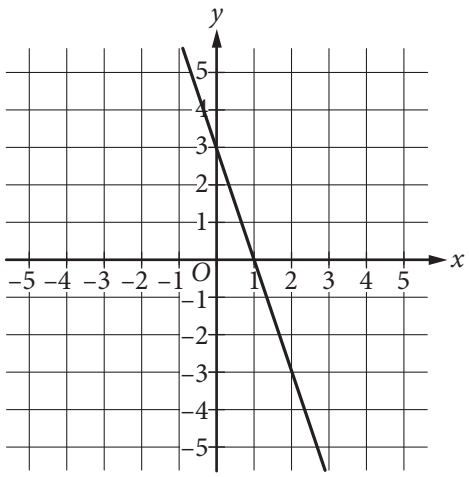
CONTINUE

5



What is the equation of the line shown in the xy-plane above?

A) $y = 3x - 3$

B) $y = -3x + 3$

C) $y = \frac{1}{3}x - 3$

D) $y = -\frac{1}{3}x + 3$

6

$$(-11x + 31y) - 2(-x + 5y)$$

Which of the following expressions is equivalent to the expression above?

A) $-13x + 21y$

B) $-13x + 36y$

C) $-9x + 21y$

D) $-9x + 36y$

7

The formula for determining the pressure, p, exerted on an object at a depth, h, below the surface of a liquid is $p = s + dgh$, where s is the atmospheric pressure, d is the density of the liquid, and g is the acceleration due to gravity. Which formula represents h in terms of p, s, d, and g ?

A) $h = \frac{p}{s} + dg$

B) $h = \frac{p - s}{dg}$

C) $h = ps - dg$

D) $h = ps + dg$

8

Rachel's costs for automobile maintenance and fuel are shown in the table below.

Cost of Automobile Ownership

Type of cost	Average cost
maintenance	5 cents per mile
fuel	14 cents per mile

In addition to fuel and maintenance, Rachel pays $1,000 a year for insurance. The equation $C = (0.05 + 0.14)x + 1{,}000$ shows the cost C, in dollars, of owning and operating the car for a year as a function of x, the number of miles driven in a year. What does the slope of the graph of this function represent?

A) The cost of insurance for a year

B) The cost of fuel and insurance for a year

C) The cost of owning and operating per mile

D) The cost of maintenance and fuel per mile

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CONTINUE

9

$$(-4x + 5) - (6x + 7) = 0$$

What is the solution to the equation above?

A) $x = 6$

B) $x = 1$

C) $x = -0.2$

D) $x = -1.2$

10

A manufacturer makes two different sizes of spherical ball bearings for use in motors. If the radius of the larger ball bearing is twice the radius of the smaller one, then the volume of the larger ball bearing is how many times the volume of the smaller one?

A) 2

B) 3

C) 6

D) 8

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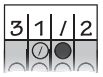
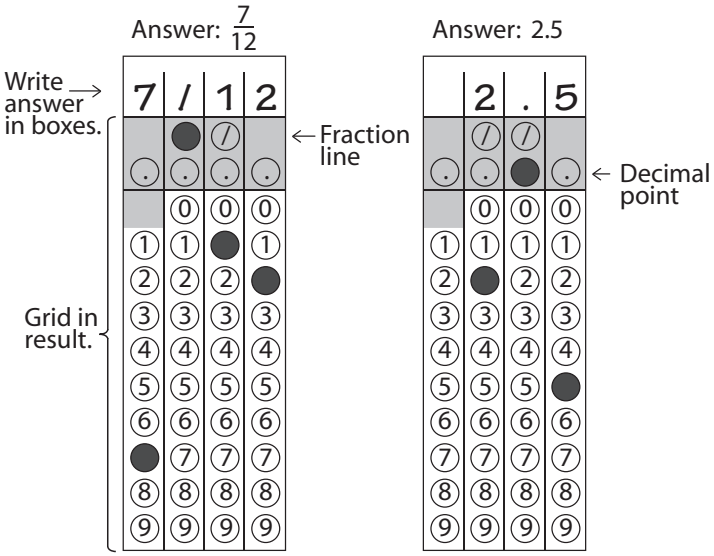
CONTINUE

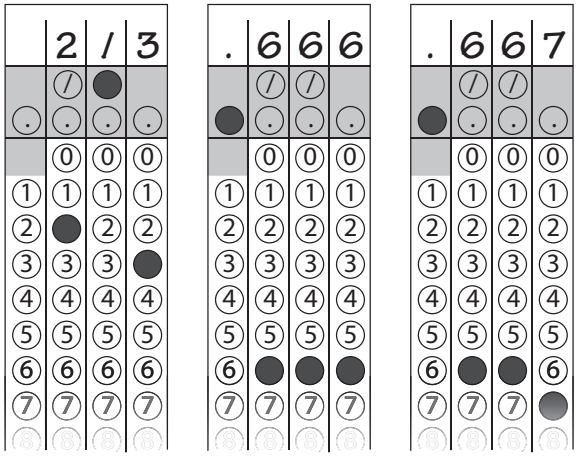
DIRECTIONS

For questions 11–13, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

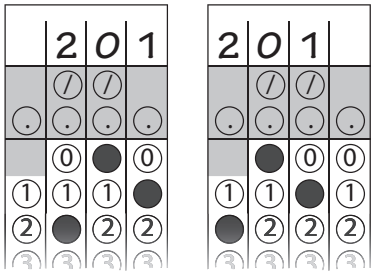
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
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.

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CONTINUE

11

If the equation $y = 2x^2 - 5x + 3$ is graphed in the xy-plane, what is the value of its y-intercept?

12

The solution to the system of equations below is (x, y).

$$3x + y = 13$$
$$2x - 4y = 18$$

What is the value of x ?

13

A group of 12 friends went bowling. They each rented shoes for $3.00 a pair, and 4 friends bowled 2 games each, while 8 friends bowled 3 games each. Each game bowled cost each person the same amount. The total cost for the shoe rentals and the games bowled was $212.00. What was the cost, in dollars, of each game bowled? (Note: Disregard the $ sign when gridding your answer.)

STOP

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

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