Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

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

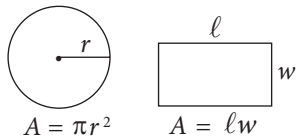
DIRECTIONS

For questions **1-15**, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. For questions **16-20**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

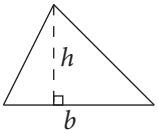
1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated,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

REFERENCE

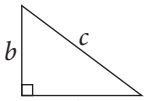


$A = \pi r^2$
$C = 2\pi r$

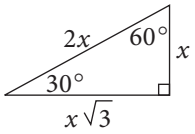
$A = \ell w$

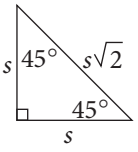


$A = \frac{1}{2}bh$

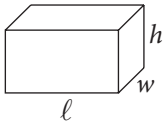


$c^2 = a^2 + b^2$

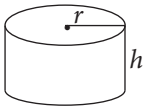




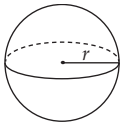
Special Right Triangles



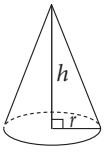
$V = \ell wh$



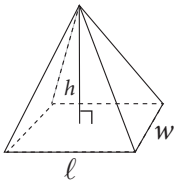
$V = \pi r^2 h$



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



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



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

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

If $17 = 3 + 8x$, what is the value of $4x + 9$?

A) 7

B) 14

C) 16

D) 25

2

Meteorologists in Atlanta have developed the following equation to estimate the temperature t, in degrees Fahrenheit, based on the number of hours h after sunrise until 4:00 P.M.:

$$t = 5h + 61.4$$

According to this model, by how many degrees Fahrenheit will the temperature rise each hour until 4:00 P.M.?

A) 3.3

B) 5

C) 12.3

D) 30.7

3

$$H = 35 - 4t$$

Every day, Lee, a home inspector, is assigned a group of houses needing to be inspected. Lee uses the model above to estimate how many houses he has left to inspect at the end of each hour, where H is the number of houses he has left to inspect and t is the number of hours he has worked so far that day. What does the value 4 represent in this model?

A) The number of hours Lee has to finish all of his assigned houses.

B) The number of houses that Lee has already inspected that day.

C) The number of total houses assigned to Lee to complete that day.

D) The rate at which Lee inspects houses.

4

If $y = 4(3x - 1)(5x - 1)$ then which of the following is equal to y ?

A) $40x$

B) $60x^2 + 4$

C) $60x^2 - 32x + 4$

D) $45x^2 + 8$

CONTINUE

5

If $\frac{7}{2x-30}=\frac{2}{x}$, then what is the value of $\frac{x}{2}$?

A) −20

B) −10

C) 10

D) 15

6

If $4=\frac{y+7}{y-7}$, then $y=$

A) $\frac{5}{21}$

B) $\frac{21}{5}$

C) 7

D) $\frac{35}{3}$

7

Line l passes through the points (1, 3) and (2, 5), and line m passes through point (1, 4) and has a slope of 1. If lines l and m intersect at point (a, b), then what is the value of $a - b$?

A) −3

B) 2

C) 5

D) 7

8

In the xy-plane, the parabola with the equation $y = (x + 4)^2$ intersects the line $y = 36$ at two points. What is the distance between those two points of intersection?

A) 6

B) 8

C) 10

D) 12

CONTINUE

9

$$f(x) = -2x^2 + c$$

In the function f above, c is a constant and $f(2) = 6$. What is the value of $f(-2)$?

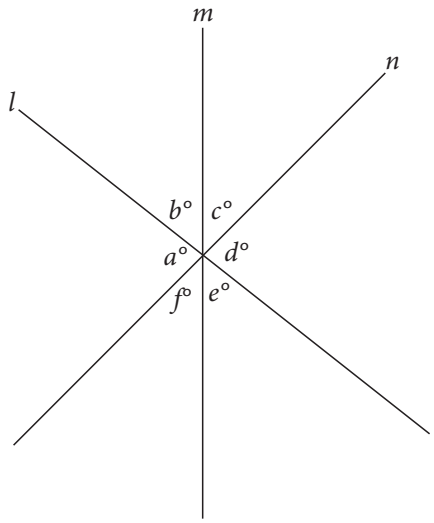
A) -6

B) 0

C) 6

D) 10

10



Note: Figure not drawn to scale.

In the figure above, lines l, m, and n intersect at a point. If $a + c = b + d$, then which of the following could be FALSE?

A) $b = c$

B) $e = f$

C) $c = f$

D) $a = b$

11

$$M = 1.35 + 0.75y$$
$$T = 2.25 + 0.60y$$

The equations above represent the average price, in dollars, of a cup of coffee in Montreal and Toronto, represented by M and T, respectively, y years after 2000. What was the average price of a cup of coffee, in dollars, in Toronto when it was equal to the average price of a cup of coffee in Montreal?

A) 5.85

B) 6.00

C) 6.45

D) 6.60

12

$$y = a(x + 6)(x - 2)$$

In the quadratic equation above, a is a nonzero constant. The graph of the equation in the xy-plane is a parabola with a vertex of (h, k). Which of the following is equivalent to k ?

A) 0

B) $-4a$

C) $-12a$

D) $-16a$

CONTINUE

13

A line in the *xy*-plane passes through the origin and has a slope of 6. Which of the following points lies on the line?

A) (0 , 6)

B) $(\frac{1}{3}, 2)$

C) (6, 0)

D) (6, 1)

14

If $a > 5$, which of the following is equivalent to $\dfrac{1}{\frac{1}{a+5}+\frac{1}{a+4}}$?

A) $2a + 9$

B) $\dfrac{2a+9}{a^2+9a+20}$

C) $a^2 + 9a + 20$

D) $\dfrac{a^2+9a+20}{2a+9}$

15

$$x^2 + \frac{1}{2}r = -\frac{q}{3}x$$

In the quadratic equation above, q and r are constants. What are the solutions for x?

A) $-\frac{q}{6} \pm \frac{\sqrt{q^2-18r}}{6}$

B) $-\frac{q}{6} \pm \frac{\sqrt{q^2-2r}}{6}$

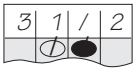
C) $-\frac{q}{3} \pm \frac{\sqrt{q^2-18r}}{3}$

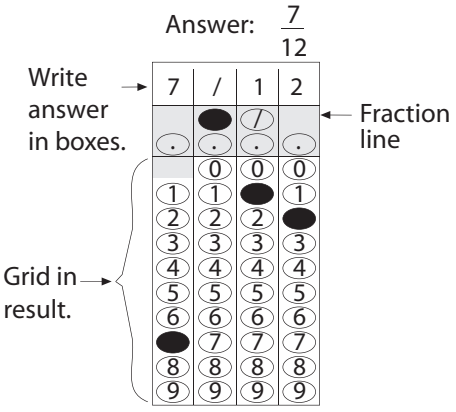
D) $-\frac{q}{3} \pm \frac{\sqrt{q^2-2r}}{3}$

CONTINUE

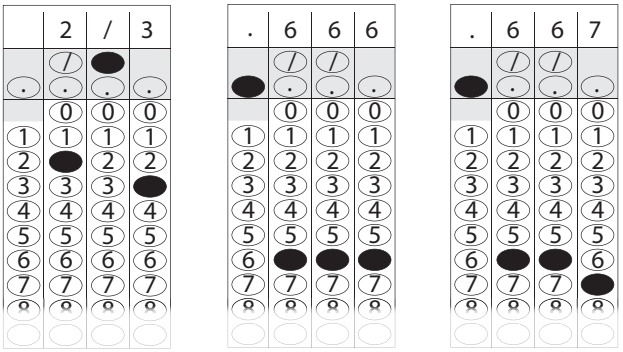
DIRECTIONS

For questions 16-20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

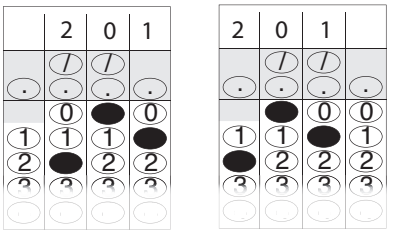
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.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



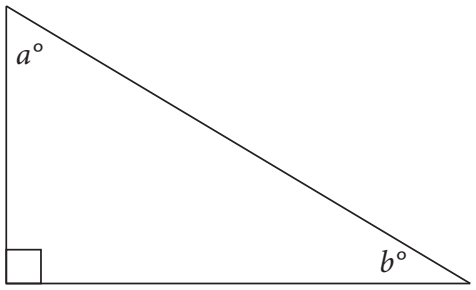
NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

16

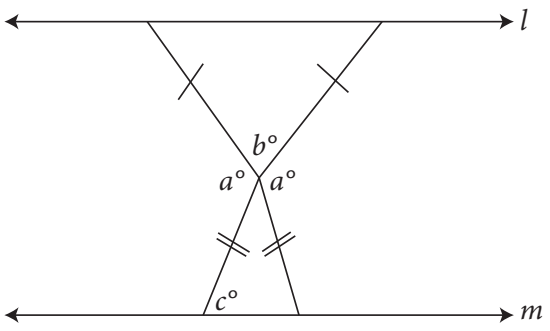
If $x > 0$ and $x^2 - 25 = 0$, what is the value of x ?

17



In the figure above, $\cos a° = \frac{5}{13}$. What is $\sin b°$?

18



Note: Figure not drawn to scale.

In the figure above, lines l and m are parallel, $180 - 2c = b$, and $c = 65$. What is the value of a ?

19

$$a + 3b = -10$$
$$a + \ \ b = -2$$

In the system of equations above, what is the value of a ?

CONTINUE

20

$$2x + 8y = 74$$
$$3x - 4y = 43$$

If (x, y) is the solution to the system of equations shown above, then what is the value of y ?

STOP

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