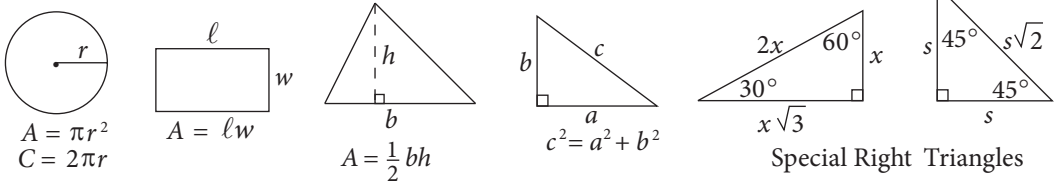
DIRECTIONS

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



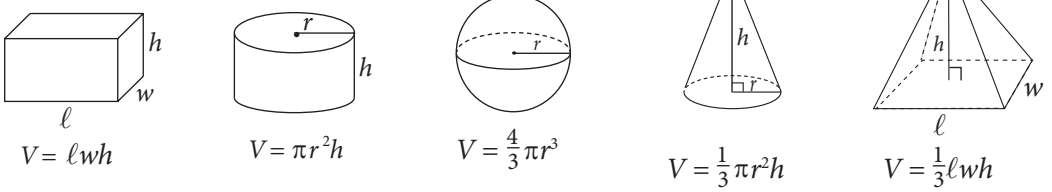
$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$

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

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

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.

2

If $n \geq m$, which of the following must be true?

A) $m - n > 1$

B) $n - m \leq 1$

C) $m + n \geq 0$

D) $m - n \leq 0$

4

If $\frac{5}{\sqrt{10}}h = \frac{3}{\sqrt{2}}$, then what is the value of h?

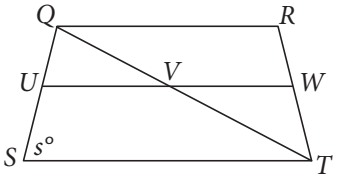
A) $\frac{3}{\sqrt{2}}$

B) $\frac{5}{\sqrt{2}}$

C) $\frac{3}{\sqrt{5}}$

D) $\frac{3}{5}$

5



Note: Figure not drawn to scale.

In the figure above, $\overline{QR} \parallel \overline{UW} \parallel \overline{ST}$ and $\overline{QV} = \overline{UV}$. If the measure of $\angle QVW$ is 122°, what is the value of s?

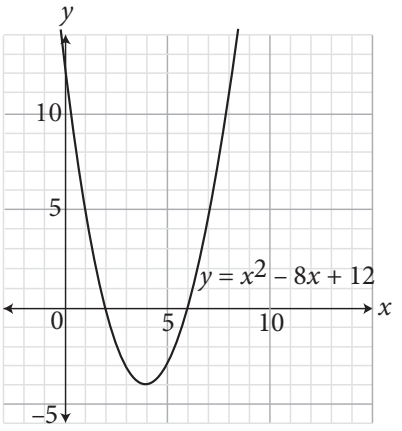
A) 29

B) 58

C) 61

D) 116

7



Which of the following equations, when graphed in the *xy*-plane above would create a system of equations with solutions at points (3, –3) and (8, 12) ?

A) $3x - y = 12$

B) $-3x + y = 12$

C) $x - 3y = 12$

D) $-x + 3y = 12$

8

Which of the following expressions is equivalent to $4^{2y}\ 8^{y}$?

A) 2^{3y}

B) 2^{5y}

C) 2^{7y}

D) 4^{3y}

11

A palm tree is planted in a pot. The monthly growth rate of the tree can be modeled as $y = 0.15x + 14$, where x represents the number of months since the tree was planted, and y is the total height of the tree, in inches. Which of the following statements is true?

A) The tree grows 14 inches per month.

B) The tree was 14 inches tall when it was planted in the pot.

C) The diameter of the pot is 14 inches.

D) The conversion factor for finding the height in centimeters is 14.

12

$$BMI = \frac{w}{h^2} \times 703$$

A physician wants to determine if her patient is at a healthy weight for his height. She calculates his Body Mass Index (BMI) using the equation above, where w is the patient's weight in pounds and h is his height in inches. If the patient is 70 inches tall, which inequality best represents the approximate weights that would suggest that the patient has a BMI greater than 25 ?

A) $w > 175$

B) $w < 175$

C) $w > 150$

D) $w < 150$

14

$$3x - 19y = 17y + 6$$

$$x = 6y + 3$$

Based on the system of equations above, what is the value of the quotient $\frac{x}{y}$?

A) $\frac{1}{6}$

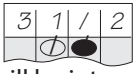
B) $\frac{2}{3}$

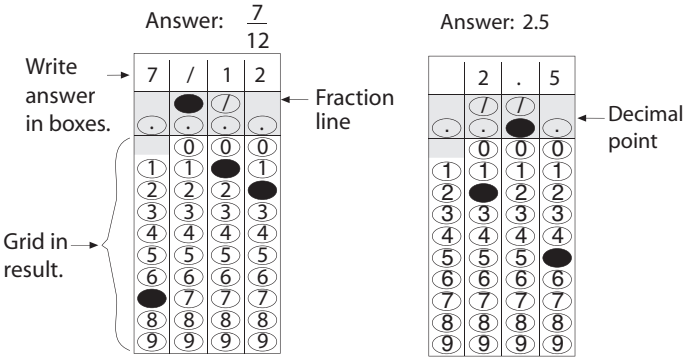
C) 4

D) 24

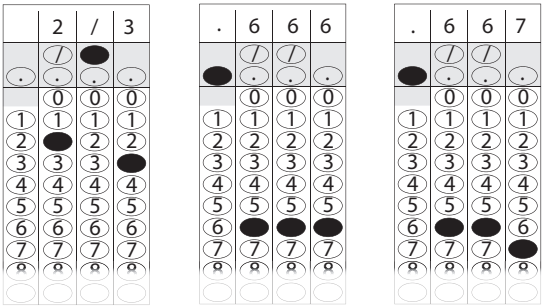
DIRECTIONS

For questions 16-18, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

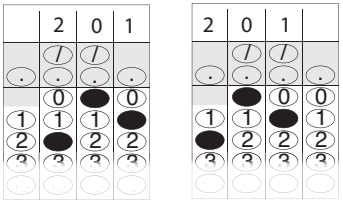
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.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



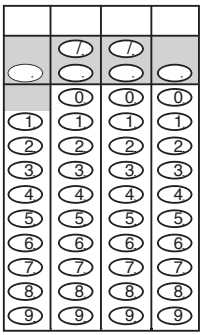
Answer: 201 – either position is correct



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

16

Let the function f be defined by $f(x) = \dfrac{\left(x^2 - x\right)}{x}$, where x is an integer and $x \neq 0$. If $10 < f(y) < 14$, what is one possible value of y ?



18

If $\dfrac{1}{z} + \dfrac{4z+2}{z^2+11z} = \dfrac{12z-24}{z^2+11z}$, what is the value of z ?