Math

22 QUESTIONS
(TIME: 35 MIN)

DIRECTIONS

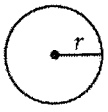
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

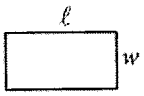
Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- The domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

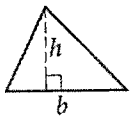
REFERENCE



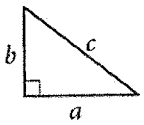
$A = \pi r^2$
$C = 2\pi r$



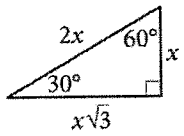
$A = \ell w$

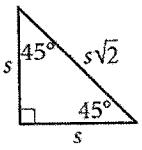


$A = \frac{1}{2}bh$

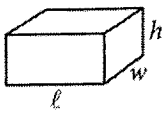


$c^2 = a^2 + b^2$

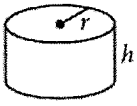




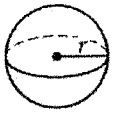
Special Right Triangles



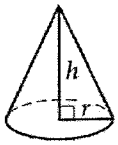
$V = \ell wh$



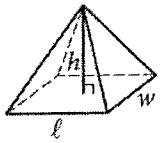
$V = \pi r^2 h$



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



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



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

The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π.

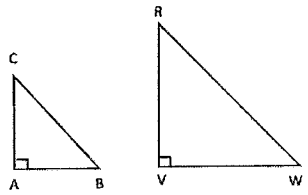
The sum of the measures in degrees of the angles of a triangle is 180.

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction (7/2) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

1



Triangle ABC is similar to triangle VWR as shown above. If $cos\angle B = \frac{5}{13}$, what is the value of $sin\angle R$?

A) $\frac{12}{13}$
B) $\frac{5}{13}$
C) $\frac{5}{12}$
D) $\frac{8}{13}$

2

The product of two positive integers is 204. If the first number is 5 less than the second number, what is the greater number?

3

At the special sale of headphones, the store offers 35% discount of the regular price. If the sales tax is 9% of the regular price and the customer paid $12.50 for the sales tax, Approximately, what is the final sale price including the sales tax of the headphones?

A) $138.89
B) $102.78
C) $104.17
D) $90.28

4

$$\sqrt{(x-1)^2} = \sqrt{3x-3}$$

What is the largest solution to the given equation?

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

WEEK7.3

5

A sample of granite has a density of 2.7 g/cm^3. If this sample shape is a cube, where the length of an edge is $1m$, which of the following expressions correctly set up to find the mass, in kg, of this sample of granite?

A) $\frac{2.7g}{cm^3} \times 100cm^3 \times \frac{1kg}{1{,}000g}$
B) $\frac{2.7g}{cm^3} \times 100^3 cm^3 \times \frac{1{,}000kg}{1g}$
C) $\frac{2.7g}{cm^3} \times 100^3 cm^3 \times \frac{1kg}{1{,}000g}$
D) $\frac{2.7g}{cm^3} \times 1{,}000^3 cm^3 \times \frac{1kg}{1{,}000g}$

6

Which of the following is an equation of a circle in the XY-plane if the circle has a center at (1, -3) and passes through (0, 0)?

A) $(x-1)^2 + (y+3)^2 = \sqrt{10}$
B) $(x-1)^2 + (y+3)^2 = 10$
C) $(x-1)^2 + (y+3)^2 = 20$
D) $(x+1)^2 + (y-3)^2 = 10$

7

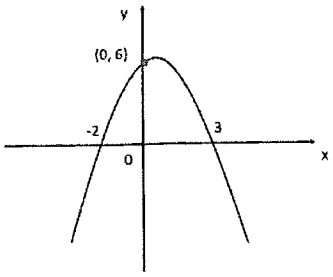
A circle has center O, and two points A and B are located on the circle. If $m\angle AOB = 68°$, what is the measure of $\angle OAB, in\ degrees$?

A) 112°
B) 56°
C) 68°
D) 34°

8

Math class A has 65 students and the mean score of class A is 83 percent. Math class B has 38 students and the mean score of class B is 95 percent. What is the mean score, in percent, of the combined classes A and B to the nearest tenth?

9



The graph of a quadratic function is shown in the XY-plane above. Which of the following is an equivalent form that could show y-intercept as a constant in the equation?

A) $y = (x + 2)(-x + 3)$
B) $y = -x^2 + x + 6$
C) $y = -\left(x - \frac{1}{2}\right)^2 + \frac{25}{4}$
D) $y = x(-x + 3) + 2(-x + 3)$

10

$$h(t) = -4.9t^2 + 14.7t$$

The equation h approximates the height of an object, in meters, t seconds after it was launched vertically straight up from the ground level. About how many seconds will the object take to hit the ground after it reached the maximum height?

A) 1
B) 1.5
C) 2.5
D) 3

11

$$P(3) = -7$$

In the polynomial function $P(x)$, the value of the function for one value of x is shown above. Which of the following must be true about $P(x)$?

A) $x - 3$ is a factor of $P(x)$.
B) $x + 3$ is a factor of $P(x)$.
C) The remainder is -7 when $P(x)$ is divided by $x - 3$.
D) $(-3, -7)$ is one of the solutions of the polynomial function $P(x)$.

12

Region	# of clam shells	Region	# of clam shells
A	22	F	3
B	18	G	27
C	19	H	18
D	25	I	22
E	15	J	26

Ocean scientists studied about the radiation effect on the ocean life from the near nuclear power plant. A square area for their research in the mudflats near the nuclear power plant measures 10 feet by 10 feet. The ocean scientists randomly chose 10 regions, A through J in the research location as shown; each region measures 1 foot by 1 foot and they counted the number of clam shells, found in each region. Which of the following is a reasonable approximate number of clam shells in the entire square area (10 ft by 10 ft)?

A) 19.5
B) 195
C) 1,950
D) 19,500

CONTINUE

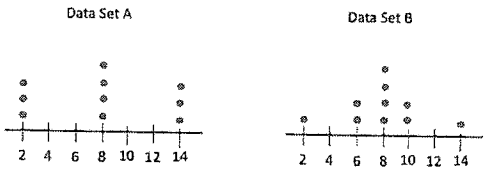
WEEK7.3

13

If the height of an isosceles right triangle, when the base is the hypotenuse of the isosceles right triangle, is $2\sqrt{2}$ inch, what is the area of the isosceles right triangle, in square inches?

E) 2
F) $2\sqrt{2}$
G) 4
H) $4\sqrt{2}$

14



The dot plots for data set A and B are shown above. Which of the following statements must be valid?

I. The median value of data set A and B are equal.
II. The mean value of data set B is higher than the mean value of data set A.
III. The standard deviation of data set A and B are not the same value.

A) I only
B) I and II
C) I and III
D) I, II, and III

15

$$x^2 - 10x + k = 0$$

The solutions to the equation above, where k is a constant, are $x = 5 \pm \sqrt{7}$. What is the value of k?

16

$$-py - \frac{5}{3}x = \frac{1}{3}(x + 1)$$
$$\frac{2}{3}x - \frac{1}{2} = -\frac{1}{2}y + 3$$

In the system of equations, p is a constant. If the system has no solutions, what is the value of p?

17

The measure of angle P is $\frac{2}{5}\pi$ radians less than the measure of angle R. How much greater is the measure of angle R than the measure of angle P, in degrees?

18

Swimming instructors and students will have swim lessons in the swimming pool. Each instructor will lead a group of no more than 5 students. The maximum capacity of the swimming pool is 120. Which of the following systems best describes the possible numbers of instructors and students in the swimming pool if x represents the number of swimming instructors and y represents the number of students?

A) $\begin{cases} x + y < 120 \\ 5x > y \end{cases}$

B) $\begin{cases} x + y < 120 \\ 5x < y \end{cases}$

C) $\begin{cases} x + y \leq 120 \\ 5x \geq y \end{cases}$

D) $\begin{cases} x + y \leq 120 \\ 5x \leq y \end{cases}$

19

What is the y-intercept of the exponential graph of $y = k(2)^{\frac{x}{3}} - l$ in the xy-plane, where k *and* l *are constants*?

A) $(0, k - l)$
B) $(k - l, 0)$
C) $(0, -l)$
D) $(-l, 0)$

20

Program at the gym	Year		
	2000	2001	2002
Kickboxing	53	64	85
Aerobic	35	40	44
Zumba	67	88	103
Cycling	15	20	26

Which of the following best represents the average rate of change in the annual number of registrations for Zumba program at the gym from the year 2000 to 2002?

A) 15 per year
B) 16 per year
C) 17 per year
D) 18 per year

21

$f(x)\ equals\ 330\%\ of\ x$

For $x > 0$, the function f is defined as the above. Which of the following could describe the function f?

A) Linearly increasing
B) Linearly decreasing
C) Exponentially increasing
D) Exponentially decreasing

22

The graph of $2x - 7y - 3 = 0$ is translated 3 units up in the XY-plane. What is the coordinate of x-intercept?

A) $(-9, 0)$
B) $(9, 0)$
C) $(3, 0)$
D) $(-3, 0)$

STOP

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