Grade 8/Algebra 1

Mathematics

Quarter 1 2019 Benchmark Exam

Name: _____

Class: _____

Directions:

- Read each question carefully. Show all work.
- For multiple-choice questions, you must mark your answers on the exam paper and on your answer sheet by darkening the circle for the letter that matches your answer choice.
- For written-response questions, you must write your answers and show of work clearly and legibly in the space provided.

Part One: Multiple Choice

____ /24

Part Two: Short Response

____ /6

Total Score

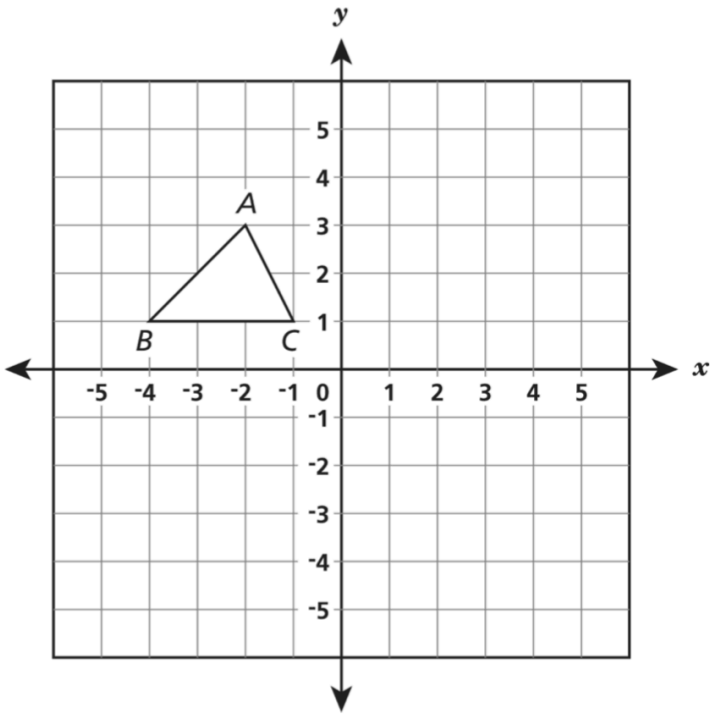
____ /30

Part I

1. A micron is a unit used to measure specimens viewed with a microscope. One micron is equivalent to 0.00003937 inch. How is this number expressed in scientific notation?

A. 3.937×10^{-5}
B. 3.937×10^{5}
C. 3937×10^{-8}
D. 3937×10^{8}

2. If ΔABC is rotated $180°$ clockwise about the origin, what will be then new coordinates of vertex B?



A. $(-1, -4)$
$B.$ $(1, 4)$
C. $(4, 1)$
D. $(4, -1)$

3. Ellentown College has approximately 3×10^{3} students and Pengrove University has approximately 30,000 students. How many times as much is the number of students at Pengrove University as the number of students at Ellentown College?

A. 1
B. 10
C. 30
D. 100

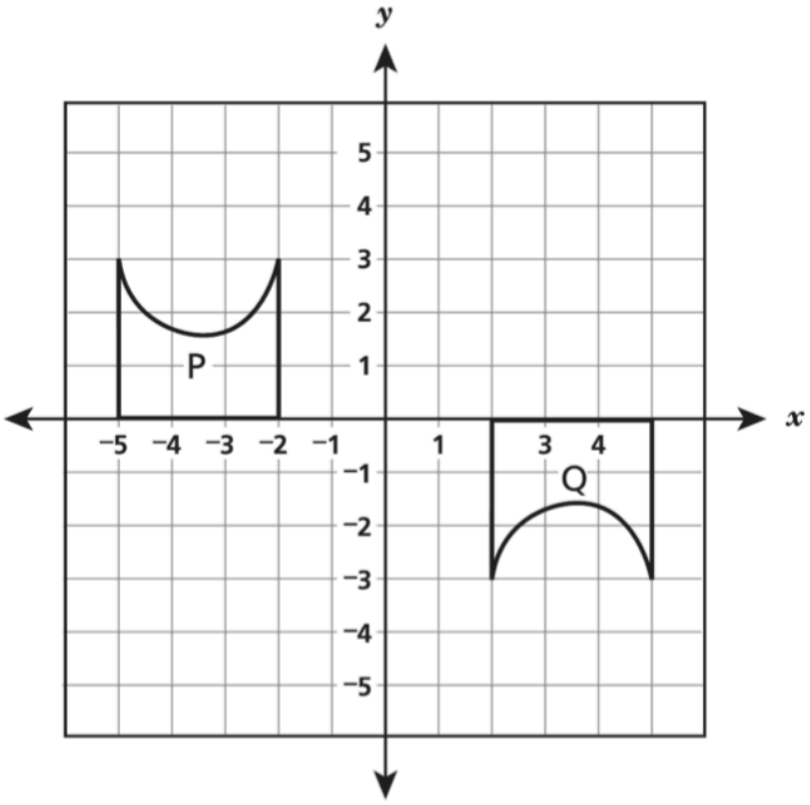
4. Two cells are viewed and measured under a microscope. The approximate diameter of each cell is listed below.

• cell P: 5.0×10^{-4} meters
• cell Q: 3.0×10^{-5} meters

What is the approximate difference, in meters, between the diameter of cell P and the diameter of cell Q?

A. 2.0×10^{-5}
B. 4.7×10^{-5}
C. 2.0×10^{-4}
D. 4.7×10^{-4}

5. Figure Q was the result of a sequence of transformations on figure P, both shown below.



Which sequence of transformations could take figure P to figure Q?

A. reflection over the x-axis and translation 7 units right
B. reflection over the y-axis and translation 3 units down
C. translation 1 unit right and 180° rotation about the origin
D. translation 4 units right and 180° rotation about the origin

6. A lab has two bacteria cultures. Culture A contains 8×10^4 bacteria, and culture B contains 4×10^6 bacteria. How do the two cultures compare in size?

A. Culture A contains $\frac{1}{25}$ as many bacteria as culture B.
B. Culture A contains twice as many bacteria as culture B.
C. Culture A contains $\frac{1}{50}$ as many bacteria as culture B.
D. Culture A contains $\frac{1}{2}$ as many bacteria as culture B.

7. Which exponential expression is equal to $2^{-5} \bullet 2^8$

A. $\frac{2^2}{2^{-1}}$
B. $(2^3)^{-1}$
C. $\frac{2^{-2}}{2^{-1}}$
D. $(2^{-1})^3$

8. At a given time, Saturn was 9.1×10^8 miles from the Sun and Earth was 9.3×10^7 miles from the Sun. By what distance is one planet closer to the Sun than the other planet?
A. 2×10^1
B. 2×10^{15}
C. 8.17×10^7
D. 8.17×10^8

9. Which expression is equivalent to $3^4 \cdot \frac{3}{3^6}$

A. 3^{-2}
B. 3^{-1}
C. 3^{10}
D. 3^{11}

10. What is the value of n in the equation shown below?

$$5^2 \times 5^n = (5^2)^{-3}$$

A. -1
B. -8
C. 4
D. -6

11. What is the solution to the equation below?

$5c + 4 = 2(c - 5)$

A. $c = -4\frac{2}{3}$
B. $c = -3$
C. $c = -2$
D. $c = -\frac{1}{3}$

12. Rectangle R undergoes a dilation with a scale factor 0.5 and then a reflection over the y-axis. The result image is Rectangle S. Which statement about Rectangles R and S is true?

A. They are congruent and similar.
B. They are similar but not congruent.
C. They are congruent but not similar.
D. They are neither congruent nor similar.

Part II

13. There are approximately seven billion (7×10^9) people in the world.

In the 1990's researchers calculated that if there were just 100 people in the world:

• There would be 20 children
• 25 people would not have food and shelter
• 17 people would speak Chinese
• 8 would speak English

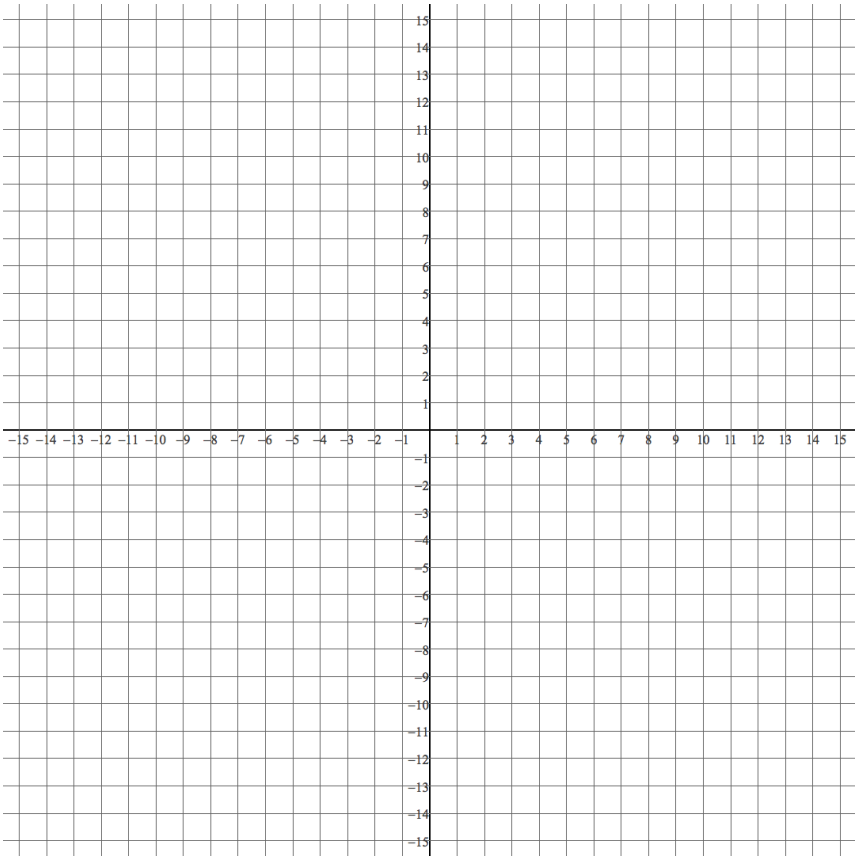
a. What fraction of people in the world do not have food and shelter? How many people in the world do not have food and shelter?

b. How many more people in the world speak Chinese than speak English?

c. Approximately 3×10^8 people live in the USA. In the world of 100 people, how many would life in the USA?

14. Square $ABCD$ is located on a coordinate plane. The coordinates for three of the vertices are listed below.

- $A(2, 7)$
- $C(8, 1)$
- $D(2, 1)$



a. Square $ABCD$ is dilated by a scale factor of 2 and then reflected over the y-axis to form square $A'B'C'D'$. What are the coordinates of $vertex\ B'$?

b. Are squares $ABCD$ and $A'B'C'D'$ similar or congruent? How do you know?