Questions 1–4 are to be solved without the use of a calculator.

1. Which statement is true?

   A. $\sqrt{78}$ is between 7 and 8.

   B. $2\sqrt{2}$ is between 3 and 4.

   C. $3\sqrt{5}$ is between 6 and 7.
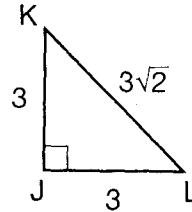
   D. $4\sqrt{17}$ is between 4 and 5.

2. Which approximates $\sqrt{7}$ to the nearest thousandth?

   A. 2.645

   B. 2.646

   C. 3.499

   D. 3.500

3. A circular rug covers an area of 39π square feet. What is the approximate radius of the circular rug, $\sqrt{39}$, to the nearest tenth of a foot?

   A. 6.2 feet

   B. 6.3 feet

   C. 6.4 feet

   D. 6.9 feet

4. The lengths, in units, of the sides of $\triangle JKL$ are shown below.

   Which is closest to the length of side KL, to the nearest tenth of a unit?

   A. 3.2 units

   B. 3.3 units

   C. 4.2 units

   D. 4.3 units
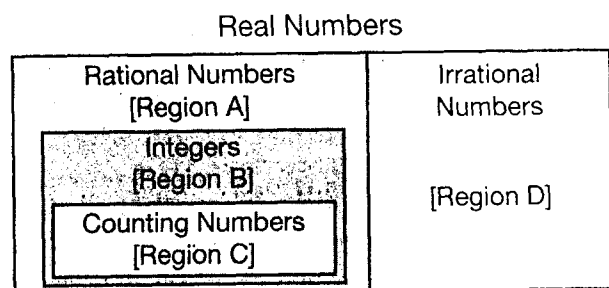
5. Which of the following is an irrational number?

   A. $\sqrt{40}$ B. $\sqrt{49}$

   C. $\sqrt{144}$ D. $\sqrt{400}$
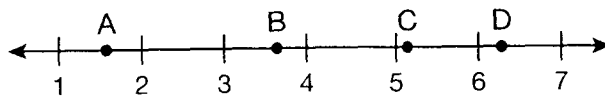
6. Which fraction is equivalent to $1.\overline{09}$?

   A. $\frac{10}{9}$

   B. $\frac{12}{11}$

   C. $\frac{35}{33}$

   D. $\frac{109}{100}$

Use the diagram below for questions 7 and 8.

Real Numbers

Rational Numbers [Region A]	Irrational Numbers
Integers [Region B]	
Counting Numbers [Region C]	[Region D]

7. Which of the following lies in Region A of the diagram?

A. $1.1\overline{6}$

B. $\sqrt{4}$

C. $\sqrt{8}$

D. $3.4326...$

8. In which region would you write $\sqrt{24}$?

A. Region A

B. Region B

C. Region C

D. Region D

9. Which expression is greater than 4?

A. $\frac{\pi}{3}$ B. $\sqrt{16}$

C. $2\sqrt{4}$ D. $3\sqrt{2}$

10. Which point **best** represents 2π?

A. point A

B. point B

C. point C

D. point D

11. Which list shows the numbers ordered from **least** to **greatest**?

A. $\sqrt{11}, \frac{12}{5}, 2.\overline{6}, \frac{\pi}{2}$

B. $2.\overline{6}, \frac{12}{5}, \sqrt{11}, \frac{\pi}{2}$

C. $\frac{\pi}{2}, \frac{12}{5}, 2.\overline{6}, \sqrt{11}$

D. $\frac{\pi}{2}, 2.\overline{6}, \frac{12}{5}, \sqrt{11}$

12. In the election for class president, Nardia received $0.\overline{56}$ of the votes. Which fraction is equivalent to $0.\overline{56}$?

A. $\frac{56}{9}$

B. $\frac{56}{88}$

C. $\frac{56}{99}$

D. $\frac{56}{100}$

13. Which expression is greater than 10?

    A. $\sqrt{61}$

    B. 2π

    C. $2\sqrt{15}$

    D. $3\sqrt{12}$

14. Miro is on the beach and wants to know how far he is from the horizon. The distance, in nautical miles, from his eye to the horizon is approximated by the expression $1.17\sqrt{h}$, where h is the height, in feet, of his eye above the surface of the water. If his eye is 5 feet above the surface of the water, what is Miro's approximate distance from the horizon?

    A. 2.2 nautical miles

    B. 2.6 nautical miles

    C. 2.9 nautical miles

    D. 5.9 nautical miles

15. Which of the following is an irrational number?

    A. $\sqrt{111}$

    B. $6.\overline{13}$

    C. $\sqrt{169}$

    D. $\frac{10}{9}$

16. Which fraction is equivalent to $0.3\overline{8}$?

    A. $\frac{3}{18}$

    B. $\frac{7}{18}$

    C. $\frac{38}{99}$

    D. $\frac{38}{100}$

17. The diameters, in centimeters, of four circles are shown in the table below.

    Diameters of Circles

Circle	Diameter (cm)
W	$2\sqrt{\pi}$
X	$\sqrt{109}$
Y	$3\sqrt{10}$
Z	$4\sqrt{2}$

    Which list orders the circles from **greatest** to **least** diameter?

    A. W, Z, Y, X

    B. W, X, Z, Y

    C. X, W, Y, Z

    D. X, Y, Z, W

18. Which of the following **cannot** be expressed as a ratio of two integers?
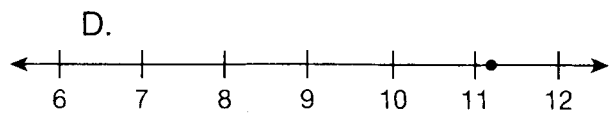
A. -11

B. $\sqrt{25}$

C. 10π

D. $15.\overline{3}$
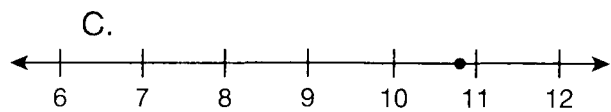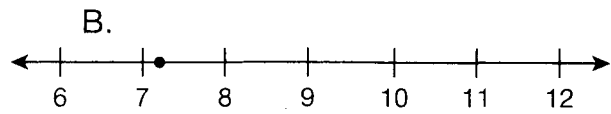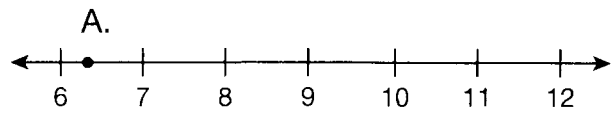
19. A tailor needs $5.1\overline{6}$ meters of fabric for a dress. Which fraction is equivalent to $5.1\overline{6}$?

A. $\dfrac{16}{3}$

B. $\dfrac{31}{6}$

C. $\dfrac{511}{99}$

D. $\dfrac{516}{100}$

20. Which fraction can be represented with a repeating decimal?

A. $\dfrac{4}{15}$

B. $\dfrac{5}{16}$

C. $\dfrac{7}{2}$

D. $\dfrac{13}{5}$

21. Which graph **best** represents $3\sqrt{13}$?

A.

B.

C.

D.

22. Which of the following is **not** a true statement?

A. $\sqrt{7} > \sqrt{\pi}$

B. $3 + \sqrt{5} > 3\sqrt{5}$

C. $\sqrt{2} + 3 < 2 + \sqrt{3}$

D. $\sqrt{5} + \sqrt{5} < \sqrt{10}$

23. Mr. Lee builds four flower beds in different shapes and sizes. The length of one dimension of each flower bed is given in the table below.
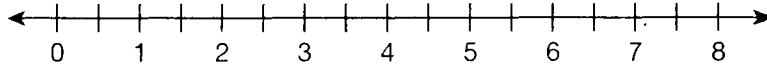
Mr. Lee's Flower Beds

Flower Bed	Length (feet)
A	$\sqrt{36}$
B	$\sqrt{14}$
C	$\dfrac{5\pi}{2}$
D	$5.\overline{1}$

A. Determine if each length is a rational or irrational number. Explain how you know.

B. Write the given length for flower bed D as a fraction. Show your work.

23. *Continued.* Please refer to the previous page for task explanation.

C. Approximate the value of each given length, without using a calculator. Show your work. Then plot points to show the approximate values on the number line below. Label the points with their corresponding letters A, B, C, and D.

$$\longleftarrow \;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;+\;|\;\longrightarrow$$

0   1   2   3   4   5   6   7   8

D. Mr. Lee is building a fifth flower bed. Its shape is a square. Its area, in square feet, is an integer represented by a. Its side length, in feet, is represented by $\sqrt{a}$. The value of $\sqrt{a}$ is between $\frac{82}{12}$ and $\sqrt{70}$.

Explain why there are only two possible integer values of a. Include the two possible values of a in your explanation.