

8.NS.1

SELECTED RESPONSE

Select the correct answer.

1. What is the decimal equivalent of the rational number $-\frac{1}{8}$?

- (A) -0.125 (C) -1.8
(B) -1.25 (D) -12.5

2. What is the decimal equivalent of the rational number $\frac{6}{11}$?

- (A) 0.54 (C) $0.\overline{54}$
(B) $0.5\overline{4}$ (D) 1.83

3. What rational number has -0.875 as its decimal equivalent?

- (A) $-\frac{7}{80}$ (C) $-\frac{7}{8}$
(B) $-\frac{4}{5}$ (D) $-\frac{35}{4}$

4. Pierre worked $5\frac{3}{8}$ hours today. What is the decimal equivalent of $5\frac{3}{8}$?

- (A) 5.25 (C) 5.375
(B) $5.\overline{3}$ (D) 5.625

Select all correct answers.

5. A company can hire 99 new employees. There are 243 applicants. Which of the following rational numbers represent the ratio of applicants to available positions?

- (A) 2.45 (D) $\frac{11}{27}$
(B) $2.4\overline{5}$ (E) $\frac{27}{11}$
(C) $2.\overline{45}$ (F) $2\frac{5}{11}$

6. Which rational numbers fall between 2.7 and 2.8 on a number line?

- (A) $\frac{11}{4}$ (D) $2\frac{41}{50}$
(B) $2\frac{19}{25}$ (E) $\frac{277}{100}$
(C) $\frac{21}{8}$ (F) $2\frac{5}{6}$

Match each rational number with its decimal equivalent.

- | | |
|------------------------------|-----------------------|
| _____ 7. $-\frac{41}{33}$ | A -1.024 |
| _____ 8. $-\frac{112}{90}$ | B $-1.0\overline{24}$ |
| _____ 9. $-\frac{31}{25}$ | C -1.204 |
| _____ 10. $-\frac{338}{330}$ | D -1.24 |
| _____ 11. $-\frac{128}{125}$ | E $-1.\overline{24}$ |
| | F $-1.\overline{24}$ |

CONSTRUCTED RESPONSE

12. On a final exam, Alex answered 21 out of 25 questions correctly. He needs to score at least 80% to receive a B in the course.

a. Written as a decimal, what portion of Alex's answers were correct?

b. How many questions need to be answered correctly to receive a score of 80%? Show your work.

c. Did Alex score at least 80% on his final exam? Give two reasons why.

13. Does 0.010110111011110... represent a rational number or an irrational number? Explain your reasoning.

14. A local middle school has 99 computers and 333 students. What is the number of students per computer at the school? Write your answer as both a rational number in simplest form and a decimal.

15. What rational number has $0.3\bar{4}$ as its decimal equivalent? Show your work.

16. Sometimes the rational number $\frac{22}{7}$ is used as an approximation of the irrational number π , whose decimal form is 3.14159..., which neither terminates nor repeats. To how many decimal places does the decimal form of $\frac{22}{7}$ agree with the decimal form of π ?

17. Let n be the decimal form of a rational number $\frac{a}{b}$, where a and b are nonzero integers.

a. If n is a terminating decimal, what is true about the factors of b ? Explain.

b. If n is a repeating decimal, what can be said about the number of digits in the repeating block? Explain.

18. Write the decimal equivalents of $\frac{1}{11}$, $\frac{2}{11}$, and $\frac{3}{11}$. Then use the results to predict the decimal equivalent of $\frac{9}{11}$.

19. On a recent math test Marcos was asked to find the decimal equivalent of $\frac{22}{25}$. Marcos gave the answer $\frac{22}{25} = 1.\overline{136}$.

a. Find the decimal equivalent of $\frac{22}{25}$ and decide whether Marcos gave a correct or incorrect answer.

b. What mistake did Marcos most likely make, if any?

8.NS.2

SELECTED RESPONSE

Select the correct answer.

- Between which pair of decimals does $\sqrt{13}$ fall on a number line?
 - (A) Between 3.2 and 3.3
 - (B) Between 3.4 and 3.5
 - (C) Between 3.6 and 3.7
 - (D) Between 3.8 and 3.9
- The number e is an irrational number approximately equal to 2.718. Between which pair of square roots does e fall?
 - (A) $\sqrt{2}$ and $\sqrt{3}$
 - (B) $\sqrt{5}$ and $\sqrt{6}$
 - (C) $\sqrt{7}$ and $\sqrt{8}$
 - (D) $\sqrt{10}$ and $\sqrt{11}$
- To the nearest tenth, what is the value of $(\sqrt{2})^3$?
 - (A) 1.3
 - (B) 2.4
 - (C) 2.7
 - (D) 2.8

Select all correct answers.

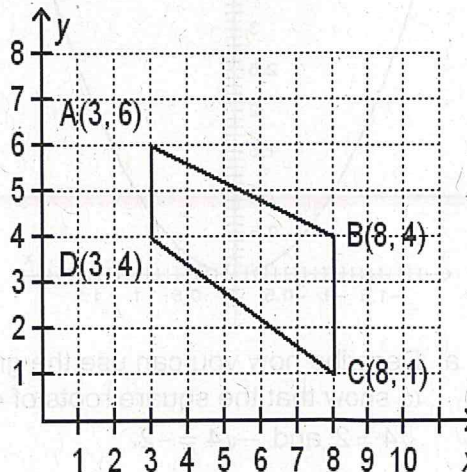
- Which of the following numbers fall between 4.7 and 4.8 on a number line?
 - (A) $\sqrt{22}$
 - (B) 1.5π
 - (C) $\frac{\sqrt{91}}{2}$
 - (D) $1 + \sqrt{15}$
 - (E) $2\sqrt{6}$
 - (F) $5 - \pi$
- Suppose each irrational number below is approximated by the whole number to which it is closest. Which of the irrational numbers have whole number approximations that are even?
 - (A) $2\sqrt{32}$
 - (B) $5 + \sqrt{18}$
 - (C) $\sqrt{24}$
 - (D) $\sqrt{52} - 3$
 - (E) $3\sqrt{14}$
 - (F) $\sqrt{20} + \sqrt{26}$

Select the correct answer for each lettered part.

- Determine whether each number is greater than $\sqrt{10}$.
 - a. $\sqrt{3} + \sqrt{6}$ Yes No
 - b. $2\sqrt{3}$ Yes No
 - c. $\frac{\sqrt{22}}{2}$ Yes No
 - d. $\sqrt{14} - \sqrt{3}$ Yes No
 - e. $\sqrt{\sqrt{10}}$ Yes No

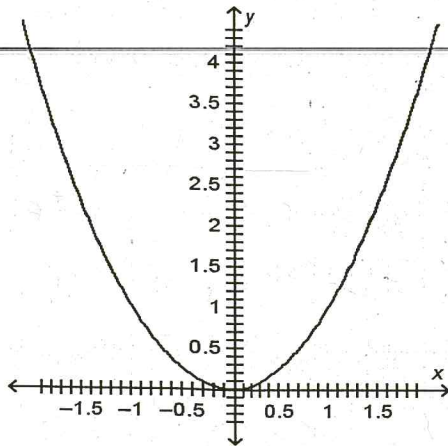
CONSTRUCTED RESPONSE

- On the coordinate grid shown below, consecutive grid lines are 1 cm apart. Find the perimeter of quadrilateral $ABCD$ to the nearest 0.1 cm. Show your work and explain your reasoning.



8. Claire lives in a town where the streets are laid out on a grid and each block has the same length. One day she walked straight from her house for 7 blocks, then turned left and walked straight 6 blocks, then turned right and walked straight 4 blocks. Find the straight-line distance, in block lengths approximated to one decimal place, between Claire's house and her destination. Show your work.

9. The graph of the squaring function $y = x^2$ is shown.



a. Describe how you can use the graph to show that the square roots of 4 are $\sqrt{4} = 2$ and $-\sqrt{4} = -2$.

b. Use the graph to estimate the square roots of 1.5 to the nearest tenth.

c. How does the graph show that 0 has only one square root?

10. After testing several numbers, Jacob wrote the following conjecture.

A positive number n is equal to its square root if $n = 1$ and is greater than its square root otherwise.

a. Find the decimal approximation of $\sqrt{0.5}$ to the nearest tenth. Explain.

b. Does your answer to part a support Jacob's conjecture? Explain.

c. Consider the following proof.

$n > 1$ Start with a number greater than 1.

$n^2 > n$ Multiply both sides by n .

$\sqrt{n^2} > \sqrt{n}$ The greater number has the greater square root.

$n > \sqrt{n}$ The square root of a positive number squared is just the number.

This is a proof of what statement?

d. Write a proof of this statement:

If a positive number is less than 1, then the number is less than its square root.
