Rational Numbers Practice

Use this key to check answers and read the explanations.

1. Which description of −11 is correct?
   A. It is both an integer and a rational number.
   B. It is rational and falls outside the integers.
   C. It is a nonnegative whole number.
   D. It is irrational.
   Correct answer: A. It is both an integer and a rational number.
   The number −11 is an integer. Writing it as −11/1 gives a ratio of two integers with a nonzero denominator, so it is also rational.

2. Which expression represents zero as a ratio of integers with a nonzero denominator?
   A. 0/0
   B. 13/0
   C. 0/13
   D. −13/13
   Correct answer: C. 0/13
   Zero divided by 13 is zero. A rational number can have a numerator of zero, and its denominator must be nonzero.

3. Which of these numbers is irrational?
   A. The square root of 64
   B. The square root of 18
   C. −0.375
   D. 7/12
   Correct answer: B. The square root of 18
   The positive integer 18 is between the perfect squares 16 and 25, so its exact square root is irrational. The square root of 64 is 8, and the decimal and fraction both represent rational numbers.

4. Which fraction in lowest terms is exactly equal to −0.36?
   A. −3/8
   B. −9/250
   C. 9/25
   D. −9/25
   Correct answer: D. −9/25
   The decimal represents negative 36 hundredths. Divide both parts of −36/100 by 4 to get −9/25.

5. The first decimal is 0.407407407… with 407 repeating forever. The second goes on forever without ever settling into a repeating block. How are the two numbers classified in that order?

A. Irrational, then rational
B. Rational, then irrational
C. Both rational
D. Both irrational

Correct answer: B. Rational, then irrational
A decimal that repeats a fixed block is rational. A decimal that goes on forever without an eventually repeating pattern is irrational.

6. Which list puts −0.71, −7/10, −3/4, and −0.68 in order from least to greatest?

A. −3/4, −0.71, −7/10, −0.68
B. −0.68, −7/10, −0.71, −3/4
C. −3/4, −7/10, −0.71, −0.68
D. −0.71, −3/4, −7/10, −0.68

Correct answer: A. −3/4, −0.71, −7/10, −0.68
Write −3/4 as −0.75 and −7/10 as −0.70. The ordered values are −0.75, −0.71, −0.70, and −0.68.

7. What is −7/12 − (−5/18)?

A. −1/3
B. −31/36
C. 11/36
D. −11/36

Correct answer: D. −11/36
Subtracting −5/18 is the same as adding 5/18. In thirty-sixths, the result is −21/36 + 10/36 = −11/36.

8. What is (−3/10) ÷ (9/25)?

A. −6/5
B. −27/250
C. −5/6
D. 5/6

Correct answer: C. −5/6
Multiply −3/10 by 25/9, the reciprocal of the divisor. The product is −75/90, which simplifies to −5/6.

9. Which of these fractions has a terminating decimal form?

A. −14/56
B. −10/24
C. −9/42
D. −16/44

Correct answer: A. −14/56
Reduce first. The fraction −14/56 becomes −1/4, whose denominator has only 2 as a prime factor. It equals −0.25. The other reduced denominators are 12, 14, and 11, each with a prime factor other than 2 or 5.

10. Which fraction equals −0.454545… exactly, with 45 repeating forever?

A. 5/11
B. −9/20
C. −1/22
D. −5/11

Correct answer: D. −5/11
Let y be the positive decimal 0.454545… with 45 repeating. The repeating tails of 100y and y are identical, so subtracting gives 99y = 45. Then y = 5/11, and applying the original minus sign gives −5/11.

11. Which terminating decimal lies strictly between −4/9 and −7/16?

A. −0.436
B. −0.445
C. −0.44
D. −0.4375

Correct answer: C. −0.44
The two bounds are −0.4444… and −0.4375. The value −0.4400 is greater than the first bound and less than the second. The value −0.4375 equals an endpoint and is excluded.

12. A marker starts at −11/8 on a number line. It moves 0.6 unit to the right, then 5/16 unit to the left. What is its final coordinate?

A. −37/80
B. −87/80
C. −27/16
D. −183/80

Correct answer: B. −87/80
Moving right adds 0.6, and moving left subtracts 5/16. In eightieths the calculation is −110/80 + 48/80 − 25/80 = −87/80.

13. In −0.283333..., only the 3 repeats forever. Which fraction equals this number exactly?

A. −17/59
B. −283/1000
C. −28/99
D. −17/60

Correct answer: D. −17/60
Let y be 0.283333... with 3 repeating. Then 1000y is 283.333... and 100y is 28.333... with the same repeating tail. Subtract to get 900y = 255, so y = 17/60. Applying the original minus sign gives −17/60.

14. Let n be a positive integer. The fraction −n/60 must have a terminating decimal and lie strictly between −0.4 and −0.3. Which value of n works?

A. 21
B. 19
C. 22
D. 24

Correct answer: A. 21
Multiply the interval inequality by −60 and reverse both comparisons to get 18 < n < 24. For n = 21 the fraction simplifies to −7/20, or −0.35. The choices 19 and 22 leave a factor of 3 in the reduced denominator, and 24 gives the excluded endpoint −0.4.

15. Start with x, subtract 1/6, then multiply the result by −3/2. The final value is exactly 0.8888..., with 8 repeating forever. What was x?

A. −41/54
B. −16/27
C. −23/54
D. 41/54

Correct answer: C. −23/54
The repeating decimal equals 8/9. Multiply it by −2/3 to undo multiplication by −3/2. This gives x − 1/6 = −16/27. Adding 1/6 gives x = −23/54.