Natural, Whole, Integers and Rational Numbers

Each new family of numbers answers a question the old one could not, and every family lives inside the next: N ⊂ W ⊂ Z ⊂ Q.

Name: _____ Date: _____ Score: ____ / 17

A. Fill in the blanks

1. Natural numbers start from ____.

2. Whole numbers are natural numbers together with ____.

3. Integers include negative numbers, zero and ____ numbers.

4. A rational number is p/q where p, q are integers and q ≠ ____.

B. True or False

5. 0 is a natural number. True / False

6. Every integer is a rational number. True / False

7. −3 is a whole number. True / False

8. 0/5 is a rational number. True / False

C. Assertion and reason

9. Assertion (A): Every integer is a rational number.
Reason (R): Any integer n can be written as n/1.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

10. Assertion (A): 0 is a natural number.
Reason (R): 0 is a whole number.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

D. Choose the correct option

11. Which is a whole number but not natural?

(a) 1
(b) 0
(c) −1
(d) 1/2

Answer: _____

12. Which is not rational?

(a) −7
(b) 3/4
(c) 0
(d) 5/0

Answer: _____

13. The correct order of sets is:

(a) Q ⊂ Z ⊂ W ⊂ N

(b) N ⊂ W ⊂ Z ⊂ Q

(c) W ⊂ N ⊂ Z ⊂ Q

(d) Z ⊂ N ⊂ W ⊂ Q

Answer: _____

14. −4 belongs to:

(a) N only

(b) W only

(c) Z and Q

(d) none

Answer: _____

E. Short answer questions

15. Write N, W, Z and Q and show how they are related.

16. Is 0 rational? Is 5/0 rational? Explain.

F. Match the columns

17. Match each item in Column A with the correct item in Column B.

Column A	Column B	Your answer
1. {1, 2, 3, …}	(a) Integers	1 → ____
2. {0, 1, 2, …}	(b) Rational numbers	2 → ____
3. {…, −1, 0, 1, …}	(c) Whole numbers	3 → ____
4. p/q, q ≠ 0	(d) Natural numbers	4 → ____

Detailed solutions

1. 1

2. 0

3. positive

4. 0

5. False. Natural numbers start from 1.

6. True. n = n/1.

7. False. Whole numbers are 0, 1, 2, …

8. True. 0/5 = 0, and the denominator is not 0.

9. (a) R shows why A holds.

10. (d) A is false; R is true.

11. (b) 0. 0.

12. (d) 5/0. Division by zero is undefined.

13. (b) N ⊂ W ⊂ Z ⊂ Q. Each set contains the previous.

14. (c) Z and Q. It is an integer and rational.

15. N = {1,2,3,…}, W = {0,1,2,…}, Z = {…,−1,0,1,…}, Q = {p/q, q ≠ 0}. N ⊂ W ⊂ Z ⊂ Q.

16. 0 = 0/1, so it is rational. 5/0 is not a number because division by zero is undefined.

17. 1 → (d), 2 → (c), 3 → (a), 4 → (b). Each family adds numbers the previous one lacked.