

Rational Numbers Worksheet

1. Are the following statements true or false? Give reasons for your answers.

- (i) Every whole number is a natural number.
- (ii) Every whole number is a rational number.
- (iii) Every integer is a rational number.
- (iv) Every rational number is a whole number.
- (v) Sum of two irrational numbers need not be irrationals.
- (vi) Difference of two irrational numbers need not be irrationals.
- (vii) Product of two irrational numbers need not be irrationals.
- (viii) quotient of two irrational numbers is irrationals.
- (ix) Sum of a rational number and an irrational number is irrational.
- (x) The cube roots of all positive integers are always irrational.

2. Arrange $-5/9$, $7/12$, $-2/3$ and $11/18$ in the ascending order of their magnitudes.

3. Without doing any actual division, find which of the following rational numbers have terminating decimal representation:

- (i) $7/16$
- (ii) $23/125$

(iii) $9/14$

(iv) $32/45$

(v) $43/50$

(vi) $17/40$

(vii) $61/75$

(viii) $123/250$

4. State whether the following numbers are rational or not:

(i) $(2 + \sqrt{2})$

(ii) $(3 - \sqrt{3})$

(iii) $(5 + \sqrt{5})(5 - \sqrt{5})$

(iv) $(\sqrt{3} - \sqrt{2})$

5. Express $0.\bar{3}$ in the form of p/q , where p and q are integers and $q \neq 0$.

6. Express $1.\bar{4}$ in the form of p/q , where p and q are integers and $q \neq 0$.

7. Express $0.9999999\dots$ as a fraction in simplest form.

8. Express $2.4\overline{178}$ in the form of p/q , where p and q are integers and $q \neq 0$.

9. Express $32.12\overline{35}$ in the form of p/q , where p and q are integers and $q \neq 0$.

10. Express $0.\overline{38} + 1.\overline{27}$ in the form of p/q , where p and q are integers and $q \neq 0$.

11. Write three numbers whose decimal expansion are non-terminating and non-repeating.

12. Give an example of two irrational numbers whose

(i) difference is an irrational number.

(ii) difference is a rational number.

(iii) sum is an irrational number.

(iv) sum is a rational number.

- (v) product is an irrational number.
- (vi) product is a rational number.

- (vii) quotient is an irrational number.
- (viii) quotient is a rational number.

13. Write in ascending order:

- (i) $3\sqrt{5}$ and $4\sqrt{3}$
- (ii) $2^{\sqrt{5}}$ and $3^{\sqrt{2}}$
- (iii) $6\sqrt{5}$, $7\sqrt{3}$ and $8\sqrt{2}$

14. Write in descending order:

- (i) $2^{\sqrt{6}}$ and $3^{\sqrt{2}}$
- (ii) $7\sqrt{3}$ and $3\sqrt{7}$

15. Simplify the following expressions:

- (i) $(5 + \sqrt{7})(2 + \sqrt{5})$
- (ii) $(5 + \sqrt{5})(5 - \sqrt{5})$
- (iii) $(\sqrt{3} + \sqrt{7})^2$
- (iv) $(\sqrt{11} - \sqrt{7})(\sqrt{11} + \sqrt{7})$

Ans. 1 (i) false (ii) true (iii) true (iv) false (v) true (vi) true (vii) true (viii) false

(ix) true (x) False

2. $-\frac{2}{3}$, $-\frac{5}{9}$, $\frac{7}{12}$ and $\frac{11}{18}$

3. (i) terminating (ii) terminating (iii) non-terminating (iv) non-terminating

(v) terminating (vi) terminating (vii) non-terminating (viii) terminating

4. (i) irrational (ii) irrational (iii) rational (iv) irrational

5. $\frac{1}{3}$

6. $1\frac{4}{9}$

7. 1

8. $\frac{12077}{4995}$

9. $\frac{318023}{9900}$

10. $\frac{164}{99}$

11. $\sqrt{2}, \sqrt{3}, \sqrt{5}$

12. (i) $2 - \sqrt{3}, 2 + \sqrt{3}$ (ii) $2 + \sqrt{3}, 5 + \sqrt{3}$ (iii) $5 + \sqrt{2}, \sqrt{3} - 5$

(iv) $3 + \sqrt{2}, 3 - \sqrt{2}$ (v) $2 + \sqrt{2}, 3 - \sqrt{2}$ (vi) $4 + \sqrt{3}, 4 - \sqrt{3}$

(vii) $\sqrt{18}, \sqrt{3}$ (viii) $\sqrt{27}, \sqrt{3}$

13. (i) $3\sqrt{5} < 4\sqrt{3}$ (ii) $2\sqrt[3]{5} < 3\sqrt[3]{2}$ (iii) $8\sqrt{2} < 7\sqrt{3} < 6\sqrt{5}$

14. (i) $3\sqrt[4]{2} > 2\sqrt[4]{6}$ (ii) $7\sqrt{3} > 3\sqrt{7}$

15. (i) $10 + 5\sqrt{5} + 2\sqrt{7} + \sqrt{35}$ (ii) 20 (iii) $10 + 2\sqrt{21}$ (iv) 4