



Name:

Due Date:

Teacher:

Parent Sign:

---

Questions

1. Is  $\pi$  rational or irrational?
2. Is 0.75 rational or irrational?
3. Is  $\frac{2}{3}$  rational or irrational?
4. Is  $\sqrt{2}$  rational or irrational?
5. Is -3.5 rational or irrational?
6. Classify 0.333333... (repeating 3) as rational or irrational.
7. Classify 0.142857142857... (repeating 142857) as rational or irrational.
8. Classify 0.125 as rational or irrational.
9. Classify 0.101001000100001... (pattern getting more zeros each time) as rational or irrational.
10. Is the decimal 0.230230230... (repeating block 230) rational or irrational?
11. Is  $\sqrt{16}$  rational or irrational?
12. Is  $\sqrt{18}$  rational or irrational? If irrational, simplify  $\sqrt{18}$ .
13. Is  $\sqrt[3]{27}$  (cube root of 27) rational or irrational?
14. Is  $\sqrt[3]{2}$  (cube root of 2) rational or irrational?
15. Is  $\sqrt[3]{\frac{9}{25}}$  rational or irrational? Give its simplified value.
16. Simplify  $\sqrt{50}$  and state whether it is rational or irrational.
17. Simplify  $\sqrt{81}$  and state whether it is rational or irrational.
18. Is  $\sqrt{\frac{1}{4}}$  rational or irrational? Give its simplified value.
19. Classify  $\sqrt{\frac{3}{2}}$  as rational or irrational.
20. Classify  $-\sqrt{5}$  as rational or irrational.
21. Is the sum  $\sqrt{2} + 3$  rational or irrational?
22. Is the product  $\sqrt{2} \times \sqrt{2}$  rational or irrational? Compute it.
23. Is the product  $2 \times \sqrt{3}$  rational or irrational?
24. Is the quotient  $\sqrt{18} \div \sqrt{2}$  rational or irrational? Simplify.
25. Is  $\sqrt{2} + \sqrt{8}$  rational or irrational? Simplify if possible.
26. Is  $\sqrt{2} + 1$  rational or irrational?
27. Is  $\sqrt{2} - 1$  rational or irrational? What is its value?
28. Is the sum of two rational numbers always rational? Give a short example or counterexample.
29. Is the sum of two irrational numbers always irrational? Provide an example or counterexample.
30. Is the product of a nonzero rational number and an irrational number always irrational? Explain or give an example.
31. Classify the number 7 (natural, whole, integer, rational, irrational).



# Math Worksheet for 8th Grade

## Irrational numbers

Name: \_\_\_\_\_

Due Date: \_\_\_\_\_

Teacher: \_\_\_\_\_

Parent Sign: \_\_\_\_\_

---

32. Classify the number -12 (integer, rational, irrational).
33. Classify 0 (whole number, integer, rational, irrational).
34. A square has side length 1 unit. What is the length of the diagonal? Is that length rational or irrational?
35. A square has area 2 square units. What is the side length? Rational or irrational?
36. A rectangle is 3 units by 4 units. What is the diagonal? Rational or irrational?
37. A circle has radius 5 units. What is the circumference? Is it rational or irrational (use  $\pi$ )?
38. A circle has area 7 square units. What is its radius? Rational or irrational?
39. The hypotenuse of a right triangle is 5 and one leg is 1. Is the other leg length rational or irrational? (Use Pythagorean theorem:  $leg^2 = hypotenuse^2 - other^2$ .)
40. Find the length of the diagonal of a regular hexagon made by joining opposite vertices of a regular equilateral triangle of side length 1. (Hint: consider triangles or use  $\sqrt{3}$ .)
41. Is  $(\sqrt{2} - \sqrt{2})$  rational or irrational? What is its value?
42. Is  $(\sqrt{18})/(\sqrt{2})$  rational or irrational? Simplify.
43. Is  $(\sqrt{3} + 1)(\sqrt{3} - 1)$  rational or irrational? Simplify.
44. Classify  $\sqrt{(121)}$  as rational or irrational and give its value.
45. Classify  $(125)$  as rational or irrational and give its value.
46. Consider the decimal 1.41421356 (approximation of  $\sqrt{2}$ ). Is this decimal exactly rational or exactly irrational as written? Explain.
47. True or False: A terminating decimal always represents a rational number. Explain briefly.
48. True or False: A non-terminating, repeating decimal always represents a rational number. Explain briefly.
49. Which of these numbers are irrational:  $\sqrt{7}$ ,  $\frac{49}{7}$ , 0.285714285714... (repeating 285714),  $\sqrt{121}$ ?
50. Give an example of a number that is irrational and an example that is rational. Explain in one sentence why each fits its category.