

Chapter 1.2 Check Your Understanding

Exercises 1–5 True or False. Give reasons.

1. The number π is equal to $\frac{22}{7}$.

Answer:

False; $\frac{22}{7}$ is a rational number and is only an approximation of π , which is an irrational number.

2. The integer 119 is a prime number.

Answer:

False; $119 = 7 \cdot 17$.

3. The intersection of the set of rational numbers and the set of irrational numbers is the empty set.

Answer:

True; no number is both rational and irrational.

4. The set of prime numbers is a subset of the set of odd numbers.

Answer:

False; 2 is a prime number but it is not odd.

5. The sum of any two odd numbers is an odd number.

Answer:

False; try $3 + 5$.

Exercises 6–10 Fill in the blank so that the resulting statement is true.

6. The product of two odd numbers is an _____ number.

Answer:

If $2n - 1$ and $2m - 1$ are any two odd numbers, then $(2n - 1)(2m - 1) = 4mn - 2m - 2n + 1 = 2(2mn - m - n) + 1$ and so the product must be an odd number.

7. When $\frac{5}{7}$ is expressed as a repeating decimal, the eighth digit after the decimal is _____.

Answer:

1; $\frac{5}{7} = 0.\overline{714285}$.

8. Of the numbers $\frac{5}{71}$, $-\frac{24}{17}$, $\sqrt{25 - 9}$, $\sqrt{64 - 14}$, the one that is irrational is _____.

Answer:

Since $\sqrt{25 - 9} = \sqrt{16} = 4$, and $5/71$, $-24/17$ are rational numbers, then $\sqrt{64 - 14} = \sqrt{50} = 5\sqrt{2}$ is an irrational number.

9. Of the four numbers π , $\sqrt{64 + 16}$, 0.564 , $\frac{\sqrt{5}}{2}$, the one that is rational is _____.

Answer:

$$0.564; 0.564 = \frac{564}{1000}.$$

10. Of the four numbers $\frac{8}{11}$, $\frac{5}{7}$, 0.714 , $0.\overline{714}$ the smallest one is _____.

Answer:

$$0.714; \frac{8}{11} \approx 0.72727, \frac{5}{7} \approx 0.71429, 0.714, 0.\overline{714} \approx 0.714714.$$