

- Label each of the following statements as true or false.
 - 3 is odd and the set of all natural numbers is closed under addition.
 - 12 is even and -7 is a natural number.
 - 5 is greater than 7 or 5 is equal to 7. (We write this as $5 \geq 7$ read: 5 is greater than or equal to 7)
 - 8 is less than 8 or 8 is equal to 8. (We write this as $8 \leq 8$ read: 8 is less than or equal to 8)
- List all natural numbers x with the given property.
 - $x < 6$
 - $x < 7$ and $x > 3$
 - $x < 7$ or $x > 3$
 - $x \leq 10$ and x is even
- Simplify each of the following expressions by applying the order of operations agreement. **Show all steps. For each step, write a separate line!**
 - $8 - 2 + 3$
 - $\frac{15 - 2^3 + 3}{3^2 - 2^3}$
 - $120 \div (4 + 3(5 \cdot 2^2 - 2(5 + 2^2)))$
 - $\frac{3^2 - 2^2}{(3 - 2)^2}$
 - $(3 - (10 - 3^2)^2)^2$
 - $\frac{100 \div 5 \cdot 2}{25 - 10 + 5}$
 - $32 - 3(28 - 2^2(20 - 5 \cdot 3))$
 - $\left(\left((10 - 8)^2 - 1\right)^2 - 2\right)^2$
 - $1^2 + 1^3 - 1^4 + 1^5$
 - $2^2 + 2^3$
 - $2^5 - 3(12 - 3^2)^2$
 - $5 \cdot 2^3 - (10 - (7 - 2 \cdot 3 + 1) \div 2 + 2^2)$
 - $\left(2 - \left(2 - (10 - 3^2)^2\right)^2\right)^2$
- Insert parentheses in the expression on the left-hand side to make the equation true.

$$36 - 2 \cdot 5 - 2^2 + 4 = 10$$

Answers

1. a) true b) false c) false d) true

2. a) 1, 2, 3, 4, 5 b) 4, 5, 6 c) all natural numbers d) 2, 4, 6, 8, 10

3. a) 9 b) 10 c) 12 d) 5 e) 4 f) 2 g) 8 h) 49 i) 2 j) 12 k) 5 l) 27 m) 1

4. $36 - 2 \cdot ((5 - 2)^2 + 4) = 10$