

Section 2.1**Problem A (not in the text)** Which of the following are statements? Explain.

1. Let x be a positive integer. Then \sqrt{x} is rational.
2. Mathematics is fun.
3. The President of the United States in 1905 was a woman.
4. The integer 105 is prime.

2.4 Consider the open sentence $P(x) : x(x - 1) = 6$ over the domain \mathbb{R} .

- (a) For what values of x is $P(x)$ a true statement?
- (b) For what values of x is $P(x)$ a false statement?

2.8 Let $P(n) : \frac{n^2+5n+6}{2}$ is even

- (a) Find a set S_1 of three integers such that $P(n)$ is an open sentence over the domain S_1 and $P(n)$ is true for each $n \in S_1$.
- (b) Find a set S_2 of three integers such that $P(n)$ is an open sentence over the domain S_2 and $P(n)$ is false for each $n \in S_2$.

Section 2.2**2.14** State the negation of each of the following statements.

- (a) At least two of my library books are overdue.
- (b) One of my two friends misplaced his homework assignment.

Section 2.3**Problem B (not in the text)** Consider the following two statements:

$$P : -2 \in \mathbb{N}, \quad Q : 7 > -9.$$

Determine which of the following statements are true.

- (a) $P \vee Q$
- (b) $P \vee (\sim Q)$
- (c) $P \wedge Q$
- (d) $(\sim P) \wedge Q$
- (e) $(\sim P) \vee (\sim Q)$

Section 2.4**2.20** For statement P and Q , construct a truth table for $(P \implies Q) \implies (\sim P)$.