Introduction to Mathematical Thinking
Assignment 2

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Solutions

1. (a) $0 < \pi < 10$
   (b) $7 \leq p < 12$
   (c) $5 < x < 7$
   (d) $x < 4$
   (e) $y < 9$
   (f) $x = 0$

2. (a) pi is more than zero and less than ten.
   (b) p is more than six and less than twelve.
   (c) x is more than five and less than seven.
   (d) x is less than four.
   (e) y is less than three.
   (f) x is less than or equal to one.

3. Show all of $\phi_1 \vee \phi_2 \vee \cdots \vee \phi_n$ are true.

4. Show that one of $\phi_1 \vee \phi_2 \vee \cdots \vee \phi_n$ is false.

5. (a) $\pi > 3$
   (b) $x \neq 0$
   (c) $x \geq 0$
   (d) $x \geq 0$
   (e) $x^2 > 9$

6. (a) pi is more than three.
   (b) x is not equal to zero.
   (c) x is more than or equal to zero.
   (d) x is more than or equal to zero.

(e) x squared is more than nine.

7. Show that one of $\phi_1 \vee \phi_2 \vee \cdots \vee \phi_n$ is true.

8. Show that all of $\phi_1 \vee \phi_2 \vee \cdots \vee \phi_n$ are false.

9. (a) $\pi \leq 3.2$
   (b) $x \geq 0$
   (c) $x = 0$
   (d) $x \neq 1$
   (e) ψ

10. (a) pi is less than or equal to three point two.
    (b) x is greater than or equal to zero.
    (c) x is equal to zero.
    (d) x is not equal to zero.
    (e) psi.

11. (a) $D \wedge Y$
    (b) $\neg Y \wedge T \wedge D$
    (c) $\neg(D \wedge Y)$
    (d) $T \wedge \neg D \wedge \neg Y$
    (e) $\neg T \wedge D \wedge Y$