

## Exercises

1. Which of these sentences are propositions? What are the truth values of those that are propositions?

- a) Boston is the capital of Massachusetts.
- b) Miami is the capital of Florida.

1 c)  $2 + 3 = 5$ .

1 e)  $x + 2 = 11$ .

d)  $5 + 7 = 10$ .

10 Answer this question.

2. Which of these are propositions? What are the truth values of those that are propositions?

- a) Do not pass go.
- b) What time is it?
- c) There are no black flies in Maine.
- d)  $4 + x = 5$ .
- e) The moon is made of green cheese.
- f)  $2^n \geq 100$ .

3. What is the negation of each of these propositions?

- a) Today is Thursday.

b) There is no pollution in New Jersey.

1 c)  $2 + 1 = 3$ .

d) The summer in Maine is hot and sunny.

4. Let  $p$  and  $q$  be the propositions

$p$  : I bought a lottery ticket this week.

$q$  : I won the million dollar jackpot on Friday.

Express each of these propositions as an English sentence.

1 a)  $\neg p$

1 b)  $p \vee q$

1 c)  $p \rightarrow q$

1 d)  $p \wedge q$

e)  $p \leftrightarrow q$

f)  $\neg p \rightarrow \neg q$

1 g)  $\neg p \wedge \neg q$

h)  $\neg p \vee (p \wedge q)$

5. Let  $p$  and  $q$  be the propositions "Swimming at the New Jersey shore is allowed" and "Sharks have been spotted near the shore," respectively. Express each of these compound propositions as an English sentence.

a)  $\neg q$

b)  $p \wedge q$

c)  $\neg p \vee q$

d)  $p \rightarrow \neg q$

e)  $\neg q \rightarrow p$

f)  $\neg p \rightarrow \neg q$

g)  $p \leftrightarrow \neg q$

h)  $\neg p \wedge (p \vee \neg q)$

links

