CSCI 2011 HW 0

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1 1.1 Problem 7

For a real number x, consider the open sentence P (x) : x(x - 5) = 6. For which values of x is P(x) a true statement?

$$x^2 - 5x = 6$$
$$x^2 - 5x - 6 = 0$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} => x = \frac{5 \pm \sqrt{25 - 4(1)(-6)}}{2}$$
$$x = \frac{5 \pm \sqrt{1}}{2} => x = \frac{4}{2}, \frac{6}{2}$$
$$x = 2, 3$$

2 1.2 Problem 11

Verify the following De Morgan's Law by a truth table. For two statements *P* and *Q*, $\sim (P \wedge Q) \equiv (\sim P) \vee (\sim Q)$

P	Q	$\sim P$	$\sim Q$	$\sim (P \wedge Q)$	$(\sim P) \vee (\sim Q)$
T	T	F	F	F	F
T	F	F	T	T	T
F	T	T	F	T	T
F	F	T	T	T	T

They have the same truth values, so they're logically equivalent.

3 1.2 Problem 13

Use De Morgan's Laws to state the negations of the following.

(a) **Either** $x = 0$ **or** $y = 0$**.** Both x and y are not zero.

(b) **The integers *a* and *b* are both nonnegative.** Either a is negative or b is negative.