Review Test for CSI 35
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1. The sentence "If it's raining then I'm holding an umbrella." is equivalent to (circle all correct answers):

   A. If I'm holding an umbrella then it's raining.

   B. If I'm not holding an umbrella then it's not raining.

   C. It's not raining or I'm holding an umbrella.

   D. It's raining and I'm holding an umbrella.

   E. It's not raining or I'm holding an umbrella.

2. Given that all crows are black and have two feet which of the following sentences are true?

   A. All crows that are blue have two legs.

   B. All crows that are blue have three legs.

   C. There exists a crow that is blue and has three legs.

3. Find the prime factorizations of the following numbers:

   (a) 51

   (b) 198

4. Expand in full: $(x + y)^{10}$.

5. Consider the set $\Sigma = \{a, b, c, d, e\}$.

   (a) How many words of length 5 can we make using letters from Σ?

   (b) How many of the words in part (a) start with a vowel and end with a consonant?

   (c) How many words of length 5 can we make if each letter is to be used only once?

   (d) How many of words in part (c) have all three consonants next to each other?

6. Perform the following matrix multiplication:

$$
\begin{pmatrix} 1 & 2 & 3 \\ 3 & 1 & 0 \\ 5 & 0 & -2 \end{pmatrix} \cdot \begin{pmatrix} -3 & 1 \\ 0 & 4 \\ 5 & -1 \end{pmatrix}
$$

7. Recall that a bitstring is a string made up of zeros and ones.

   (a) How many bitstrings of length 6 are there?

   (b) How many subsets does the set $\{1, 2, 3, 4, 5, 6\}$ have?