Math 181: Quiz 8

Directions: You have 15 minutes to answer the following questions without outside resources. Turn your quiz over when you are done.

1. (4 points) Encrypt the following message using a Caesar cipher with a shift of 4 (A → E, B → F, etc.).
   SNOW IN APRIL
   \[ \text{WRSJ MR ETVMP} \]

2. (4 points) Find the smallest positive number that satisfies the following expressions.
   (a) \( 10 \pmod{3} = \frac{1}{10-1+9} \)
   (c) \(-4 \pmod{6} = \frac{2}{-4+2+6} \)
   (b) \( 24 \pmod{5} = \frac{4}{24-4+20} \)
   (d) \( 10 \pmod{7} = \frac{3}{10-7+3} \)

3. (2 points) Represent the following binary number in base 10 (decimal).
   \[ \begin{array}{c}
   1101001 \\
   \end{array} \]
   \[ \begin{align*}
   1 \cdot 2^6 + 0 \cdot 2^5 + 1 \cdot 2^4 + 0 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \\
   = 64 + 32 + 1 \\
   \end{align*} \]
   \[ = 105_{10} \]