Math 371
Quiz 1, February 11, 2014 Name: Solution.

1. (3 points) Convert the decimal number 47.75 to binary. Give a complete explanation.

$47.75 = 32 + 8 + 4 + 2 + 1 + \frac{1}{2} + \frac{1}{4}$.

Thus, $47.75 = (101111.11)_2$.

2. (3 points) Convert the binary number 100101100.011 to decimal. Give a complete explanation.

$(100101100.011)_2 = 1\times 2^8 + 1\times 2^5 + 1\times 2^3 + 1\times 2^2 + 1\times 2^{-2} + 1\times 2^{-3}$

$= 256 + 32 + 8 + 4 + \frac{1}{4} + \frac{1}{8}$

$= 300 + \frac{3}{8}$

$= 300.375$

3. (4 points) Explain what machine epsilon is and the role it plays for the floating point machine number system.

See notes or text.