Sample Final

1. Evaluate each expression. Indicate floats by including a decimal point (so to show 1 as a float, write “1.0”). If any cannot be evaluated, say why.

(a) \(3 + 5.0\)
(b) \(10 \% 4 + 7 \div 2\)
(c) \(\text{abs}(5 - 20 \div 3) ** 4\)
(d) "If \(\%d + \%d = \%2.2f\), then \(\%s\)" (2, 2, 4, "bye")
(e) \(4 \div "3"\)

2. Convert the following into Python; you may assume the string and math modules are imported already:

(a) The volume \(vol\) of a sphere is \(4\pi r^3\) divided by 3 (remember the result is a floating point number!)
(b) The value of the string variable \(str\) with all occurrences of the letter “e” replaced by the character “3”
(c) Subtract 159 from the product of 3 and 27, using integers

3. The A–F grading system assigns the following grades to scores. If your score is less than 1 point, you get an F; if it is less than 2 points, you get a D; if it is less than 3 points, you get a C; if you get less than 4 points, you get a B; and if you get 4 points or more, you get an A. Write an “if” statement that, given a score in the variable score, prints the corresponding grade.

4. What does the following function do when given a list of numbers as the argument?

\[
def f(lst):
\]
\[
\begin{align*}
a &= i = 0 \\
n &= \text{len}(lst) \\
\text{while } i < n:
\quad \text{if } lst[i] \leq 0:
\quad \quad i += 1 \\
\quad \quad \text{continue}
\quad a += lst[i] \\
\quad i += 1
\end{align*}
\]
\[
\text{return } a / n
\]

5. Rewrite the function in problem 4 so that it uses a “for” loop, not a “while” loop.

6. What does the following program do:

\[
d = \text{dict}()
\text{while True:}
\begin{align*}
\text{try:} \\
\quad \text{line} &= \text{input("EOF to stop> ")}
\end{align*}
\begin{align*}
\text{except EOFError:} \\
\quad \text{break}
\end{align*}
\text{for } i \text{ in line:}
\begin{align*}
\quad d[i] &= d.get(i, 0) + 1
\end{align*}
\text{u = d.keys()}
\text{for } i \text{ in sorted(u):}
\begin{align*}
\quad \text{print}(i, d[i])
\end{align*}

7. What does the following program do:
def y(n):
    if n < 10:
        return str(n)
    else:
        d = str(n % 10)
        return y(n // 10) + d

print(y(174))