

MATH 120 In-class Activity

Day 17

Question 1. Practice your understanding of the factorial function.

- (a) What is $0!$ defined to be?
- (b) Use the fact that the value of $9!$ is 362880 to compute $10!$.
- (c) Simplify the expression $\frac{(n+2)!}{n!}$.

- (d) Use your answer to the previous question to compute $\frac{102!}{100!}$.

Question 2. Define the “fractional part” function as follows:

$$\{x\} = x - \lfloor x \rfloor.$$

As an example, 0.3 is the fractional part of 5.3 because $\{5.3\} = 5.3 - \lfloor 5.3 \rfloor = 5.3 - 5 = 0.3$,

- (a) Compute the following:
 - $\{9/2\} =$
 - $\{\pi\} =$
 - $\{-7.77\} =$
- (b) Determine the domain and range of the “fractional part” function.

- (c) Draw the graph of the “fractional part” function.

Question 3. Practice your understanding of div and mod.

(a) Determine the quotient and remainder when 102 is divided by 5

(b) Determine the quotient and remainder when 777 is divided by 23

(c) Determine the quotient and remainder when 7 is divided by 17

(d) Determine the quotient and remainder when -123 is divided by 19.

(e) Write the set of integers n that satisfy $n \% 9 = 5$ in roster notation.

(f) Write the set of integers n that satisfy $n // 9 = 3$ in roster notation.

Question 4. Are there any pairs of *positive* integers a and b where $a \bmod b = a \operatorname{div} b$? If so, give a few examples for different values of a and b . If not, explain why it is not possible.