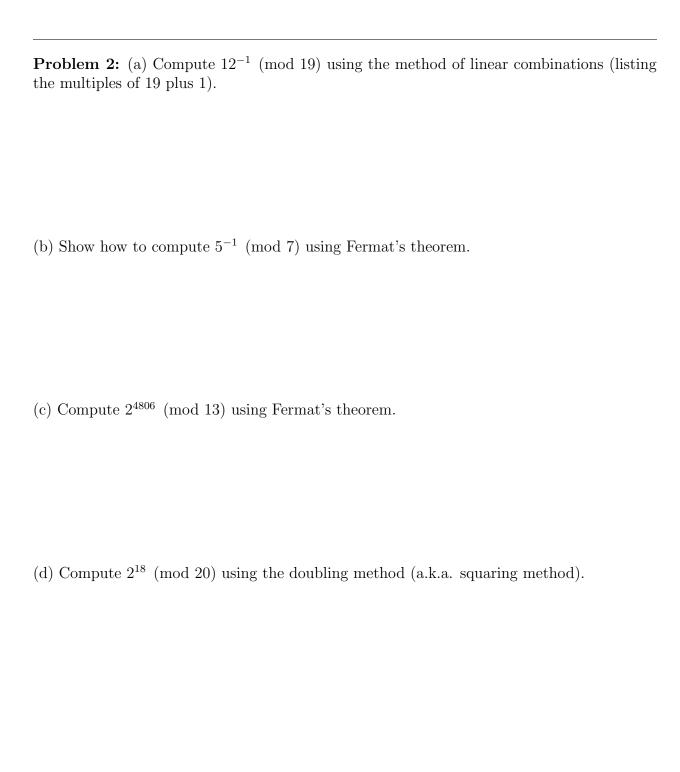
NAME: SID:

Problem 1: For each piece of pseudo-code below, give its asymptotic running time as a function of n. Express this running time using the $\Theta()$ notation. Include a brief justification (at most 15 words).

Pseudo-code	Running time	Justification
for $i \leftarrow 1$ to n do $z \leftarrow z + 5$ $k \leftarrow 1$ while $k < n$ do $z \leftarrow z^{2}$ $k \leftarrow 2k$		
for $i \leftarrow 1$ to $2n + 3$ do $z \leftarrow z + 5$ for $i \leftarrow 1$ to $7n$ do $z \leftarrow z^2$		
$\begin{array}{c} j \leftarrow 1 \\ \textbf{while} \ j < n \ \textbf{do} \\ z \leftarrow z + 5 \\ \textbf{for} \ i \leftarrow 1 \ \textbf{to} \ j \ \textbf{do} \\ z \leftarrow z^2 \\ j \leftarrow 2j \end{array}$		
for $i \leftarrow 1$ to n do $z \leftarrow z + 2$ for $j \leftarrow 1$ to i do $z \leftarrow z^2$		

Note: " \leftarrow " denotes the assignment statement. The scope and nesting of loops is indicated by the indentation.



Problem 3: In the statements below x, y, z denote positive integers. below tell whether it is true (circle your answer) and justify your answer		tatement
(a) Assume that y, z are different primes. If x is a multiple of y an x is a multiple of z then x is a multiple of yz .	TRUE	FALSE
(b) If x is prime and x divides yz then x divides y or z .	TRUE	FALSE
(c) If x is prime and x divides $y + z$ then x divides y or z .	TRUE	FALSE
(d) If x is a multiple of y and x is a multiple of z then x is a multiple of yz .	TRUE	FALSE