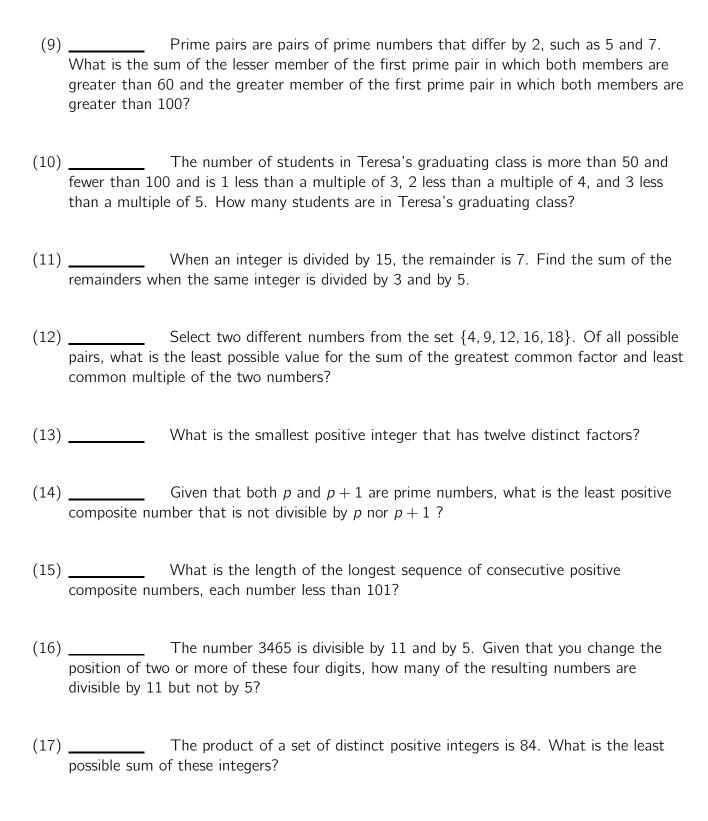
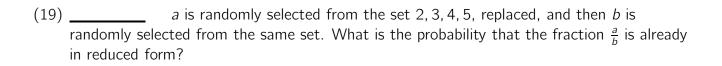
## Number Theory 4A3

	Name
(1)	How many combinations of two positive two-digit integers have 429 as the product?
(2)	What is the units digit of 1998 <sup>1998</sup> ?
(3)	How many positive even three-digit integers are divisible by 3?
(4)	A positive integer less than 100 is a multiple of 3. Determine the probability that it also leaves a remainder of 1 when divided by 7. Express your answer as a common fraction.
(5)	If three different odd positive integers less than 50 are randomly selected, what is the probability none of the three are prime?
(6)	The decimal representation of a fraction ends in $0.\overline{3}$ . When the decimal is changed to a common fraction and reduced to lowest terms, what is the denominator of the fraction?
(7)	The digital root of a number is found by computing the sum of its digits, computing the sum of the digits of that sum, and continuing to compute the sum of the digits until a one-digit number is obtained. What is the digital root of $2^{100}$ ?
	The product of the digits of a three-digit number is 63. What is the



(18) \_\_\_\_\_ Find the value of A + B in the multiplication table below:

×	?	?	?
?	В	12	20
?		21	
?	18	27	Α



- (20) \_\_\_\_\_ What is the smallest positive integer greater than 5 with the property that the number of odd primes less than or equal to it equals the number of odd non-primes less than or equal to it?
- (21) \_\_\_\_\_ Find the smallest positive integer *x* so that the fraction below represents a fraction whose decimal equivalent terminates.

$$\frac{1}{10+x}$$

- (22) \_\_\_\_\_ In how many zeroes does 20! end?
- (23) \_\_\_\_ How many positive two-digit integers are increased by exactly nine when the digits are reversed?
- (24) \_\_\_\_\_ How many positive integers are factors of  $21^{75}$ ?
- (25) \_\_\_\_\_ A proposal will make years that end in double zeroes a leap year only if the year leaves a remainder of 200 or 600 when divided by 900. Under this proposal, how many leap years will there be that end in double zeroes between 1996 and 4096?
- (26) \_\_\_\_\_ Given that  $3^n$  divides 15!, what is the greatest possible integral value of n?

(27)	Natasha has more than \$1 but less than \$10 worth of dimes. When she put her dimes in stacks of 3, she has 1 left over. When she puts them in stacks of 4, she has left over. When she puts them in stacks of 5, she also has 1 left over. How many dimes does Natasha have?		
(28)	What is the least positive integer with exactly ten factors?		
(29)	When two different numbers are divided by 7, remainders of 2 and 3, respectively, are left. What is the greatest possible three-digit product of these two numbers?		
(30)	What is the least integer $n \ge 2$ such that $2^n - 1$ is a composite number?		