FULL SAIL UNIVERSITY (/)

6.1 | Fundamentals : Number Theory

Test in WEEK 3 : INTEGERS AND INDEXED STRUCTURES

19 FEB STATUS

1 Which of the following is a possible value for x such that $x \mid 74$?

10 Points

- $x = 3$
- $x = 37$
- $x = 148$

2 Which of the following is a possible value for x such that $12 \mid x$?

10 Points

- $x = 4$
- $x = 30$
- $x = 96$

3 **Solve:**

$100 \text{ div } 8 =$

10 Points

- 12
- 4
- 8
- 12.5

4 **Solve:**

$100 \bmod 8 =$

10 Points

- 12
- 4
- 8
- 0

5 What is $gcd(625, 1000)$?

10 Points

- 5
- 25
- 125
- 5000

6 What is $gcd(243, 2000)$?

10 Points

- 1
- 405
- 486000

7 What is $lcm(625, 1000)$?

10 Points

- 5
- 25
- 125
- 5000

8 What is $lcm(243, 2000)$?

10 Points

- 1
- 405
- 486000

9

Which number is **relatively prime** to 60?

10 Points

- 2
- 3
- 5
- 25
- 49
- 360

10

Compute: $12 \ mod \ 5$

10 Points

- 7
- 2
- 10
- 5

11

Compute: $-1 \ mod \ 7$

10 Points

- 1
- 8
- -8
- 6

---

12 **Compute:** $144 \ mod 7$.

10 Points

- 144
- 4
- 20
- 7

13 **Compute:** $199 \ mod \ 19$

10 Points

- 199
- 10
- 9
- 19

14 **Compute:** $-101 \ mod \ 13$

10 Points

- 10
- 6
- 3
- 9

15 **Compute:** $2 \cdot 3 \ mod \ 5$

10 Points

- 1
- 2
- 3
- 4
- 5

16 **Find the inverse of** $3 \ (mod \ 5)$

10 Points

- 1
- 2
- 3
- 4
- 5

17 **Find the inverse of** $4 \ (mod \ 5)$

10 Points

- 2
- 5
- 7
- 9

18 **Find the inverse of** $2 \ (mod \ 17)$

10 Points

- 1
- 8
- 9
- 10

19 **Solve the linear congruence:**

$3x \equiv 4(mod \ 5)$ for x

10 Points

- 1
- 2

- 3
- 4

---

20 **Solve the linear congruence:**

$4x \equiv 5(mod\ 9)$ for x

10 Points

- $x \equiv 7(mod\ 9)$
- $x \equiv 5(mod\ 9)$
- $x \equiv 10(mod\ 9)$
- $x \equiv 8(mod\ 9)$

---

21 **Solve the linear congruence:**

$2x \equiv 7(mod\ 17)$ for x

10 Points

- $x \equiv 11(mod\ 17)$
- $x \equiv 9(mod\ 17)$
- $x \equiv 7(mod\ 17)$
- $x \equiv 12(mod\ 17)$

22

Suppose that a and b are integers such that $a \equiv 12\ (mod\ 5)$ and $b \equiv 3\ (mod\ 5)$.

Given: $c \equiv a \cdot b\ (mod\ 5)$ **Find** c **in** Z_5

10 Points

- 3
- 12
- 36
- 1

---

23 Suppose that a and b are integers such that $a \equiv 11 \ (mod \ 19)$ and $b \equiv 3 \ (mod \ 19)$.

Given $c \equiv 8 \cdot b \ (mod \ 19)$**: find** c **in** Z_{19}

10 Points

- 12
- 24
- 5
- 8

---

24 Give the solution to $190 \div 9$ using the **Division Algorithm**

10 Points

Enter your response

---

25 A parking lot has 31 visitor spaces number from 0 to 30. Visitors are assigned parking spaces using the hashing function $h(k) = k$ **mod** 31, where k is the number formed by the first three digits of the visitor's license plate.

What space is assigned to a license plate beginning with 317?

10 Points

- 0
- 3
- 7
- 31

---

26 A parking lot has 31 visitor spaces number from 0 to 30. Visitors are assigned parking spaces using the hashing function $h(k) = k$ **mod** 31, where k is the number formed by the first three digits of the visitor's license plate.

What space is assigned to a license plate beginning with 918?

10 Points

- 29
- 19
- 18
- 0

---

27 The U.S. Postal Service sells money orders identified by an 11 digit number $x_1x_2x_3 \ldots x_{11}$ The first ten digits are an identifier; x_{11} is a check digit that satisfies $x_{11} = x_1 + x_2 + \ldots + x_{10} \textbf{ mod } 9$

Find the check digit for for the USPS money order ID number that begins with 7555618873.

10 Points

- $x_{11} = 1$
- $x_{11} = 8$
- $x_{11} = 4$
- $x_{11} = 5$

---

28 Retail products are identified by their Universal Product Code. This is commonly a 12 digit number $x_1x_2x_3 \ldots x_{12}$. The first 11 digits are an identifier; x_{12} is a check digit that satisfies $3x_1 + x_2 + 3x_3 + x_4 + 3x_5 + x_6 + 3x_7 + x_8 + 3x_9 + x_{10} + 3x_{11} + x_{12} = 0 \text{ mod } 10.$

Is 987650432103 a valid UPC code?

10 Points

- Yes
- No. The check digit should be 2.
- No. The check digit should be 1.
- No. The check digit should be 0.

---

29 All books are identified by an International Standard Book Number (ISBN). This is usually a 10 digit number $x_1x_2x_3 \ldots x_{10}$. The first 9 digits are an identifier; x_{10} is a check digit that satisfies

$$x_{10} = \sum_{i=1}^{9} ix_i \textbf{ mod } 11$$

Determine the check digit for the ISBN number that begins with 007119882

10 Points

- 2
- 4
- X
- 0

---

30 **What would the encrypted value of "2017" be after applying RSA encryption with the following values:**

$p = 103$
$q = 173$
$e = 47$

10 Points

- 1372
- 6719
- 17,544
- 17,819
- 13,201

Submit

Comments