

# Advanced Number Theory

Click on a question number to see how your answers were marked and, where available, full solutions.

Question Number	Score		
1	3	/	3
2	3	/	3
3	1	/	1
4	1	/	1
5	1	/	1
6	1	/	1
Total	10	/	10 (100%)

## Performance Summary

Exam Name:	Advanced Number Theory
Session ID:	12168566681
Exam Start:	Wed Jan 31 2024 13:53:25
Exam Stop:	Wed Jan 31 2024 14:22:57
Time Spent:	0:29:31

## Question 1

### Bézout Coefficients

Find the Bézout coefficients and the gcd of 80 and 85:

✓

 Expected answer:     -1      $\times 80 +$ 
 ✓

 Expected answer:     1      $\times 85 =$ 
 ✓

 Expected answer:     5    
**a**

✓ Your answer is correct.

**b**

✓ Your answer is correct.

**gcd**

✓ Your answer is correct.

You scored **3** marks for this part.**Score: 3/3** ✓

## Question 2

### Bézout Coefficients

Find the Bézout coefficients and the gcd of 16 and 72:

 ✓

 Expected answer:     -4      $\times 16 +$ 
 ✓

 Expected answer:     1      $\times 72 =$ 
 ✓

 Expected answer:     8    
**a**

✓ Your answer is correct.

**b**

✓ Your answer is correct.

**gcd**

✓ Your answer is correct.

You scored **3** marks for this part.**Score: 3/3** ✓

## Question 3

### Modular Inverse

What is the modular inverse of  $79 \bmod 48$ ? (Make sure the number is between 0 and 47).

31

Expected answer: 31✓ Your answer is correct. You were awarded **1** mark.You scored **1** mark for this part.**Score: 1/1** ✓

## Question 4

### Modular Inverse

What is the modular inverse of  $53 \bmod 30$ ? (Make sure the number is between 0 and 29).

17

Expected answer: 17✓ Your answer is correct. You were awarded **1** mark.You scored **1** mark for this part.**Score: 1/1** ✓

## Question 5

### Modular Inverse

Solve for  $x$  in  $65x \equiv 42 \pmod{46}$ ? so that  $x$  is between 0 and 45.



Expected answer: 24

✓ Your answer is correct. You were awarded 1 mark.

You scored 1 mark for this part.

Score: 1/1 ✓

## Question 6

### Modular Inverse

Solve for  $x$  in  $61x \equiv 6 \pmod{75}$ ? so that  $x$  is between 0 and 74.



Expected answer: 21

✓ Your answer is correct. You were awarded 1 mark.

You scored 1 mark for this part.

Score: 1/1 ✓