

คำตอบแบบฝึกหัดบางข้อ

แบบฝึกหัด 1.2

1. 1, 2, 6, 24, 120, 720, 5040
2. 1, 120, 252, 120, 1
3. 84, 126, 210
9. $x = 1, y = 1, z = 2$

แบบฝึกหัด 1.3

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|----------------------|----------------------|
| 11.1 $q = 5, r = 15$ | 11.2 $q = 17, r = 0$ |
| 11.3 $q = -3, r = 7$ | 11.4 $q = -6, r = 2$ |
| 12.1 2 | 12.2 -4 |
| 12.6 -3 | |
15. 0 ถ้า $a \in \mathbb{Z}$, -1 ถ้า $a \notin \mathbb{Z}$

แบบฝึกหัด 1.4

1. 1.1 $(502)_7$
2. $(2112)_{10}$
3. 3.1 $(212)_{10}$
4. $(328)_{10}$
5. $(11111000000)_{\sim}$
6. 6.1 $(745)_8 = (1E5)_{16}$
7. 7.1 $(010101111)_2$
8. $(8F5)_{16}, (74E)_{16}$
9. $(101010111100110111101111)_2, (1101111011111010110011101101)_2,$
 $(100110100000101 1)_2$

แบบฝึกหัด 2.1

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|-------------------------------|-----------|
| 1. 1.1 5 | 1.2 111 |
| 1.3 6 | 1.4 1 |
| 1.5 11 | 1.6 2 |
| 3. $17 = 357(-7) + 629(4)$ | |
| 4. $17 = -357(7) + 629(4)$ | |
| 6. $17 = 1819(71) + 358(-36)$ | |
| 18. 18.1 2 | 18.2 5 |
| 18.3 99 | 18.4 3 |
| 18.5 7 | 18.6 1001 |

แบบฝึกหัด 2.2

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|--|---|
| 1. 1.1 13209 | 1.2 13209 |
| 1.3 8671 | |
| 2. 2.1 $2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13 \cdot 17 \cdot 19 \cdot 23 \cdot 29$ | 2.2 $2^3 \cdot 3 \cdot 5^7 \cdot 7 \cdot 11^3 \cdot 13$ |
| 2.3 $41^{11} \cdot 47^{11} \cdot 79^{11} \cdot 83^{11} \cdot 101^{1001}$ | |
| 6. 30 | |
| 7. $7 \cdot 11 \cdot 3$ | |

แบบฝึกหัด 2.4

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|---|-------------------------------------|
| 1. 1.1 $x = 33 + 5n, y = -11 - 2n$ | 1.2 $x = -300 + 13n, y = 400 - 17n$ |
| 1.3 $x = 21 + 14n, y = -21 - 21n$ | 1.4 no solution |
| 1.5 $x = 889 + 1969n, y = -633 - 1402n$ | |
| 2. $x = -11 + 31n$ | |
| $y = 6 - 13n$ | |
| 3. $x = 13 - 49n$ | |
| $y = 163 - 999n$ | |

4. 4.1 (8, 4), (5, 9), (2, 14)

4.3 (2, 7)

4.5 no solution

4.7 no solution

5. 17, 23

4.2 (6, 3)

4.4 (2, 5)

4.6 no solution

แบบฝึกหัด 3.1

1. 1.1 1, 2, 11

4. 4.1 9

4.3 0

4.5 4

9. 9.1 4 นาฬิกา

9.3, 4 นาฬิกา

11. $n = \pm 1 \pmod{6}$

18. 5

19. 1

20. 1

21. 1

22. -1

23. -1

1.2 1, 3, 9, 27, 37, 111, 999

4.2 9

4.4 12

4.6 1

9.2 6 นาฬิกา

แบบฝึกหัด 3.2

I. 1.1 3

1.3 7

1.5 812

1.7 5

3. 3.1 13

3.3 5

1.2 2, 5, 8

I .4 no solution

1.6 1596

1.8 45, 94

3.2 7

3.4 16

แบบฝึกหัด 3.3

- I. $x \equiv 52 \pmod{105}$
2. $x \equiv 4944 \pmod{9889}$
3. $x \equiv 785 \pmod{1122}$
4. $x \equiv 653 \pmod{770}$
5. $x \equiv 99 \pmod{210}$
6. $a = 62$
7. $a = 548$
8. $x \equiv 28 \pmod{30}$
9. no solution
10. $x \equiv 23 \pmod{30}$
- II. $x \equiv 44 \pmod{840}$
12. $x \equiv 100 \pmod{210}$

แบบฝึกหัด 3.4

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|-------------------------------------|---------------------|
| I. 1.1 2^8 | 1.2 2^4 |
| 1.3 2^{10} | 1.4 2^2 |
| 2. 2.1 5^3 | 2.2 5^4 |
| 2.3 5^1 | 2.4 5^9 |
| 3. 3.1 ทหาร 3 ลงตัว ทหาร 9 ไม่ลงตัว | 3.2 ลงตัวทั้งคู่ |
| 3.3 ลงตัวทั้งคู่ | 3.4 ทหาร 3 ไม่ลงตัว |
| 4. 4.1 ไม่ | 4.2 ใช่ |
| 4.3 ไม่ | 4.4 ไม่ |

แบบฝึกหัด 3.5

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|-------------------------------|-----------------------------|
| 8. 8.1 $x \equiv 9 \pmod{17}$ | 8.2 $x \equiv 17 \pmod{19}$ |
| 8.3 $x \equiv 16 \pmod{31}$ | 8.4 $x \equiv 10 \pmod{11}$ |

แบบฝึกหัด 3.6

1. 1.1 40
1.3 720
1.6 1152
3. 3.1 I, 2
3.3 no solution
3.5 no solution
4. 4.1 1, 5
4.3 1, 3, 7, 9
4.5 1, 3, 5, 7, 9, 11, 13, 15
5. 1, 3, 5, $3 \cdot 5 \cdot 2^m - 1$
6. II
11. 11.1 $x \equiv 9 \pmod{14}$
11.3 $x \equiv 7 \pmod{16}$
- 1.2 128
1.4 5760
1.7 9600
- 3.2 3, 4, 6
3.4 7, 9, 14 และ 18
3.6 35, 39, 45, 52, 56, 70, 72, 78, 84, 90
- 4.2 1, 2, 4, 5, 7, 8
4.4 I, 3, 5, 9, II. 13
4.6 1, 2, ..., 16
- I 1.2 $x \equiv 13 \pmod{15}$

แบบฝึกหัด 3.7

1. 1, 2, 6
2. 1, 3
3. 1, 6, 11, 28, 33, 38
4. no solution
5. 1, 3, 5
6. 1, 3, 5, 14, 16, 27, 122, 133, 135
9. no solution
11. 7, 15, 16, 24
12. 15
13. no solution
14. 23

แบบฝึกหัด 4.1

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|-----------|-----------------|
| 1. 1.1 4 | 1.2 4 |
| 1.3 6 | |
| 3. 3.1 3 | 3.2 2, 3 |
| 3.3 3, 7 | 3.4 2, 6, 7, 11 |
| 3.5 3, 5 | 3.6 5, 11 |
| 5. 4 ว่าง | |

แบบฝึกหัด 4.2

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|------------------|--------|
| 1. 4, 10, 22 | |
| 2. 2.1 2 | 2.2 4 |
| 2.3 8 | 2.4 6 |
| 2.5 12 | 2.6 22 |
| 3. 3.1 2 | 3.2 2 |
| 3.3 3 | 3.4 2 |
| 4. 4.1 2 | 4.2 2 |
| 4.3 2 | 4.4 3 |
| 5. 5.1 5 | 5.2 5 |
| 5.3 15 | 5.4 15 |
| 6. 7, 13, 17, 19 | |

แบบฝึกหัด 4.3

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|--|--------------------------------|
| I. $\text{ind}_2 5 = 9, \text{ind}_6 5 = 9, \text{ind}_7 5 = 3, \text{ind}_{11} 5 = 3$ | |
| 3. 3.1 $x \equiv 7 \pmod{11}$ | 3.2 $x \equiv 5, 6 \pmod{11}$ |
| 3.3 no solution | |
| 4. 4.1 $x \equiv 6, 7, 10, 11 \pmod{17}$ | 4.2 $x \equiv 5 \pmod{17}$ |
| 4.3 $x \equiv 3, 5, 6, 7, 10, 11, 12, 14 \pmod{17}$ | 4.4 $x \equiv 1 \pmod{16}$ |
| 5. 5.1 $x \equiv 9 \pmod{23}$ | 5.2 $x \equiv 9, 14 \pmod{23}$ |
| 5.3 $x \equiv 7, 18 \pmod{23}$ | 5.4 no solution |

6. 7
7. $a \equiv 2, 5, 6 \pmod{13}$
8. $b \equiv 8, 9, 20, 21 \pmod{29}$
9. $x \equiv 10, 16, 57, 90, 99, 115, 131, 134, 145, 149, 152 \pmod{156}$
14. $x^5 \equiv 13 \pmod{23}$ มีผลเฉลย