1) Problem One

a) Is a function
b) Is injective
c) N/A
---
a) Is a function
b) Is surjective
c) N/A
---
a) Is a function
b) Is bijective
c) {('x', 'c'), ('z', 'a'), ('y', 'b'), ('w', 'd')}
---
a) Is a function
b) Is injective
c) N/A
---
a) Is a function
b) Is injective
c) N/A
---
a) Is a function
b) Is surjective
c) N/A
---
a) Is a function
b) Is bijective
c) {(1, 'b'), (3, 'c'), (2, 'd'), (4, 'a')}
---
a) Is a function
b) Is neither injective nor surjective
c) N/A
---
a) Not a function
b) N/A
c) N/A
---
2) Problem Two

662/414 = 1 R 248
414/248 = 1 R 166
248/166 = 1 R 82
166/82 = 2 R 2
82/2 = 41 R 0
gcd(414, 662) = 2

14/6 = 2 R 2
6/2 = 3 R 0
gcd(6, 14) = 2

36/24 = 1 R 12
24/12 = 2 R 0
gcd(24, 36) = 12

42/12 = 3 R 6
12/6 = 2 R 0
gcd(12, 42) = 6

252/198 = 1 R 54
198/54 = 3 R 36
54/36 = 1 R 18
36/18 = 2 R 0
gcd(252, 198) = 18

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3) Problem Three

662 = 414 * 1 + 248
414 = 248 * 1 + 166
248 = 166 * 1 + 82
166 = 82 * 2 + 2
82 = 2 * 41 + 0
2 = 1 * 166 - 2 * 82
2 = 1 * 166 - 2 * (248 - 1 * 166)
2 = 3 * 166 - 2 * 248
2 = 3 * (414 - 1 * 248) - 2 * 248
2 = 3 * 414 - 5 * 248
2 = 3 * 414 - 5 * (662 - 1 * 414)
2 = 8 * 414 - 5 * 662
gcd(414, 662) = (8 * 414) + (-5 * 662)
---------------
14 = 6 * 2 + 2
6 = 2 * 3 + 0
2 = 1 * 14 - 2 * 6
gcd(6, 14) = (-2 * 6) + (1 * 14)
---------------
36 = 24 * 1 + 12
24 = 12 * 2 + 0
12 = 1 * 36 - 1 * 24
gcd(24, 36) = (-1 * 24) + (1 * 36)
---------------
42 = 12 * 3 + 6
12 = 6 * 2 + 0
6 = 1 * 42 - 3 * 12
gcd(12, 42) = (-3 * 12) + (1 * 42)
---------------
252 = 198 * 1 + 54
198 = 54 * 3 + 36
54 = 36 * 1 + 18
36 = 18 * 2 + 0
18 = 1 * 54 - 1 * 36
18 = 1 * 54 - 1 * (198 - 3 * 54)
18 = 4 * 54 - 1 * 198
18 = 4 * (252 - 1 * 198) - 1 * 198
18 = 4 * 252 - 5 * 198
gcd(252, 198) = (4 * 252) + (-5 * 198)
---------------
4) Problem Four

q0 = 1, q1 = 1, q2 = 1, q3 = 2, q4 = 41,
s0 = 1, s1 = 0, s2 = s0 - 1 * s1 = 1, s3 = s1 - -1 * s2 = -1, s4 = s2 - 2 * s3 =
2, s5 = s3 - -5 * s4 = -5,
t0 = 0, t1 = 1, t2 = t0 - -1 * t1 = -1, t3 = t1 - 2 * t2 = 2, t4 = t2 - -3 * t3
= -3, t5 = t3 - 8 * t4 = 8,
gcd(414, 662) = (8 * 414) + (-5 * 662)
---------------
q0 = 2, q1 = 3,
s0 = 1, s1 = 0, s2 = s0 - 1 * s1 = 1,
t0 = 0, t1 = 1, t2 = t0 - -2 * t1 = -2,
gcd(6, 14) = (-2 * 6) + (1 * 14)
---------------
q0 = 1, q1 = 2,
s0 = 1, s1 = 0, s2 = s0 - 1 * s1 = 1,
t0 = 0, t1 = 1, t2 = t0 - -1 * t1 = -1,
gcd(24, 36) = (-1 * 24) + (1 * 36)
---------------
q0 = 3, q1 = 2,
s0 = 1, s1 = 0, s2 = s0 - 1 * s1 = 1,
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```
t0 = 0, t1 = 1, t2 = t0 - -3 * t1 = -3,
gcd(12, 42) = (-3 * 12) + (1 * 42)
---------------
q0 = 1, q1 = 3, q2 = 1, q3 = 2,
s0 = 1, s1 = 0, s2 = s0 - 1 * s1 = 1, s3 = s1 - -3 * s2 = -3, s4 = s2 - 4 * s3 =
4,
t0 = 0, t1 = 1, t2 = t0 - -1 * t1 = -1, t3 = t1 - 4 * t2 = 4, t4 = t2 - -5 * t3
= -5,
gcd(252, 198) = (4 * 252) + (-5 * 198)
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