A logo with a circle and a circle in the middle

Description automatically generatedDiscrete Mathematics

Solo Project nr.3

Matrices and Euclidian algorithm

Problem 1.

A = B =

AB =

AB =

Problem 2.

A =

B =

AB =

AB = =

BA =

BA = =

AB = BA = , A =

Problem 3.

A = , B =

a)

= =

b)

= =

c)

= = =

Problem 4.

r = a mod d a = d \* q + r

q = a div d

a) b) c)

-19 mod 7 352 mod 19 -115 mod 3

-3 = -19 div 7 18 = 352 div 19 -39 = -115 div 3

-19 = 7 \* (-3) + r 352 = 19 \* 18 + r -115 = 3 \* (-39) + r

-19 = -21 + r 352 = 342 + r -115 = -117 + r

-19 + 21 = r 352-342 = r -115+117 = r

r = 2 r = 10 r = 2

2 = -19 mod 7 10 = 352 mod 19 2 = -115 mod 3

d)

98 mod 10 98 = 90 + r

9 = 98 div 10 98 – 90 = r

98 = 10 \* 9 + r r = 8

Problem 5.

{a | a = 5 mod 15}

5 = a mod 15

q = a div 15

a = 15 \* q + 5

a = 15 \* 0 + 5

a = 5

a = 15 \* 1 + 5

a = 20

a = 15 \* 2 +5

a = 35

a = 15 \* 3 + 5

a = 50

{…-45,-25,-10,5,20,35,50…}

Problem 6.

a)

gcd(235,477)

477 = 235 \* q + r

477 = 235 \* 2 + r

477 = 470 + r

r = 7

235 = 7 \* 33 + r

235 = 231 + r

r = 235-231 = 4

7 = 4 \* 1 +

r = 7 - 4 = 3

4 = 3 \* 1 + r

r = 4 – 3 = 1

3 = 1 \* 3 + r

r = 3 - 3 = 0

gcd(235,477) = 1

b)

gcd(1529,14039)

14039 = 1529 \* 9 + r

14039 = 13761 + r

r = 14039-13761 = 278

1529 = 278 \* 5 + r

1529 = 1390 + r

r = 1529 – 1390 = 139

278 = 139 \* 2 + r

278 = 278 + r

r = 0

gcd(1529,14039) = 139