Show polynomial division steps

This page demonstrates how to generate ECC blocks by performing polynomial divison on a message polynomial. Just enter the coefficients of the message polynomial and the desired number of ECC blocks, then click Perform Division.

If the steps are unclear, please read the error correction generation (error-correction-coding) section of the tutorial, which includes a detailed explanation of these steps.

Enter the coefficients of the message polynomial, separated by commas (no spaces):

(*example:* **32,91,11,120,209,114,220,77,67,64,236,17,236**)

Enter the desired number of ECC blocks:

(*example:* **13**)

Perform Division

Polynomial Division Steps

The first step to the division is to prepare the message polynomial for the division. The full message polynomial is:

$32x^{12} + 91x^{11} + 11x^{10} + 120x^{9} + 209x^{8} + 114x^{7} + 220x^{6} + 77x^{5} + 67x^{4} + 64x^{3} + 236x^{2} + 17x^{1} + 236$

To make sure that the exponent of the lead term doesn't become too small during the division, multiply the message polynomial by x^n where n is the number of error correction codewords that are needed. In this case n is 13, for 13 error correction codewords, so multiply the message polynomial by x^{13}, which gives us:

$32x^{25} + 91x^{24} + 11x^{23} + 120x^{22} + 209x^{21} + 114x^{20} + 220x^{19} + 77x^{18} + 67x^{17} + 64x^{16} + 236x^{15} + 17x^{14} + 236x^{13}$

The lead term of the generator polynomial should also have the same exponent, so multiply by x^{12} to get

$\alpha^{0}x^{25} + \alpha^{74}x^{24} + \alpha^{152}x^{23} + \alpha^{176}x^{22} + \alpha^{100}x^{21} + \alpha^{86}x^{20} + \alpha^{100}x^{19} + \alpha^{106}x^{18} + \alpha^{104}x^{17} + \alpha^{130}x^{16} + \alpha^{218}x^{15} + \alpha^{206}x^{14} + \alpha^{140}x^{13} + \alpha^{78}x^{12}$

Now it is possible to perform the repeated division steps. The number of steps in the division must equal the number of terms in the message polynomial. In this case, the division will take 13 steps to complete. This will result in a remainder that has 13 terms. These terms will be the 13 error correction codewords that are required.

Step 1a: Multiply the Generator Polynomial by the Lead Term of the Message Polynomial

The first step is to multiply the generator polynomial by the lead term of the message polynomial. The lead term in this case is $32x^{25}$. Since alpha notation makes it easier to perform the multiplication, it is recommended to convert $32x^{25}$ to alpha notation. According to the log antilog table, for the integer value 32, the alpha exponent is 5. Therefore $32 = \alpha^5$. Multiply the generator polynomial by α^5:

The exponents of the alphas are added together. The result is:

$\alpha^5x^{25} + \alpha^{79}x^{24} + \alpha^{157}x^{23} + \alpha^{181}x^{22} + \alpha^{105}x^{21} + \alpha^{91}x^{20} + \alpha^{105}x^{19} + \alpha^{111}x^{18} + \alpha^{109}x^{17} + \alpha^{135}x^{16} + \alpha^{223}x^{15} + \alpha^{211}x^{14} + \alpha^{145}x^{13} + \alpha^{83}x^{12}$

Now, convert this to integer notation:

$32x^{25} + 240x^{24} + 213x^{23} + 49x^{22} + 26x^{21} + 163x^{20} + 26x^{19} + 206x^{18} + 189x^{17} + 169x^{16} + 9x^{15} + 178x^{14} + 77x^{13} + 187x^{12}$

Step 1b: XOR the result with the message polynomial

Since this is the first division step, XOR the result from 1a with the message polynomial.

$(32 \oplus 32)x^{25} + (91 \oplus 240)x^{24} + (11 \oplus 213)x^{23} + (120 \oplus 49)x^{22} + (209 \oplus 26)x^{21} + (114 \oplus 163)x^{20} + (220 \oplus 26)x^{19} + (77 \oplus 206)x^{18} + (67 \oplus 189)x^{17} + (64 \oplus 169)x^{16} + (236 \oplus 9)x^{15} + (17 \oplus 178)x^{14} + (236 \oplus 77)x^{13} + (0 \oplus 187)x^{12}$

The result is:

$0x^{25} + 171x^{24} + 222x^{23} + 73x^{22} + 203x^{21} + 209x^{20} + 198x^{19} + 131x^{18} + 254x^{17} + 233x^{16} + 229x^{15} + 163x^{14} + 161x^{13} + 187x^{12}$

Discard the lead 0 term to get:

$171x^{24} + 222x^{23} + 73x^{22} + 203x^{21} + 209x^{20} + 198x^{19} + 131x^{18} + 254x^{17} + 233x^{16} + 229x^{15} + 163x^{14} + 161x^{13} + 187x^{12}$

Step 2a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $171x^{24}$. Convert $171x^{24}$ to alpha notation. According to the log antilog table, for the integer value 171, the alpha exponent is 178. Therefore $171 = \alpha^{178}$. Multiply the generator polynomial by α^{178}:

$(\alpha^{178} * \alpha^0)x^{24} + (\alpha^{178} * \alpha^{74})x^{23} + (\alpha^{178} * \alpha^{152})x^{22} + (\alpha^{178} * \alpha^{176})x^{21} + (\alpha^{178} * \alpha^{100})x^{20} + (\alpha^{178} * \alpha^{86})x^{19} + (\alpha^{178} * \alpha^{100})x^{18} + (\alpha^{178} * \alpha^{106})x^{17} + (\alpha^{178} * \alpha^{104})x^{16} + (\alpha^{178} * \alpha^{130})x^{15} + (\alpha^{178} * \alpha^{218})x^{14} + (\alpha^{178} * \alpha^{206})x^{13} + (\alpha^{178} * \alpha^{140})x^{12} + (\alpha^{178} * \alpha^{78})x^{11}$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{178}x^{24} + \alpha^{252}x^{23} + \alpha^{(330 \% 255)}x^{22} + \alpha^{(354 \% 255)}x^{21} + \alpha^{(278 \% 255)}x^{20} + \alpha^{(264 \% 255)}x^{19} + \alpha^{(278 \% 255)}x^{18} + \alpha^{(284 \% 255)}x^{17} + \alpha^{(282 \% 255)}x^{16} + \alpha^{(308 \% 255)}x^{15} + \alpha^{(396 \% 255)}x^{14} + \alpha^{(384 \% 255)}x^{13} + \alpha^{(318 \% 255)}x^{12} + \alpha^{(256 \% 255)}x^{11}$

The result is:

$\alpha^{178}x^{24} + \alpha^{252}x^{23} + \alpha^{75}x^{22} + \alpha^{99}x^{21} + \alpha^{23}x^{20} + \alpha^{9}x^{19} + \alpha^{23}x^{18} + \alpha^{29}x^{17} + \alpha^{27}x^{16} + \alpha^{53}x^{15} + \alpha^{141}x^{14} + \alpha^{129}x^{13} + \alpha^{63}x^{12} + \alpha^{1}x^{11}$

Now, convert this to integer notation:

$171x^{24} + 173x^{23} + 15x^{22} + 134x^{21} + 201x^{20} + 58x^{19} + 201x^{18} + 48x^{17} + 12x^{16} + 40x^{15} + 21x^{14} + 23x^{13} + 161x^{12} + 2x^{11}$

Step 2b: XOR the result with the result from step 1b

Use the result from step 1b to perform the next XOR.

$(171 \oplus 171)x^{24} + (222 \oplus 173)x^{23} + (73 \oplus 15)x^{22} + (203 \oplus 134)x^{21} + (209 \oplus 201)x^{20} + (198 \oplus 58)x^{19} + (131 \oplus 201)x^{18} + (254 \oplus 48)x^{17} + (233 \oplus 12)x^{16} + (229 \oplus 40)x^{15} + (163 \oplus 21)x^{14} + (161 \oplus 23)x^{13} + (187 \oplus 161)x^{12} + (0 \oplus 2)x^{11}$

The result is:

$0x^{24} + 115x^{23} + 70x^{22} + 77x^{21} + 24x^{20} + 252x^{19} + 74x^{18} + 206x^{17} + 229x^{16} + 205x^{15} + 182x^{14} + 182x^{13} + 26x^{12} + 2x^{11}$

Discard the lead 0 term to get:

$115x^{23} + 70x^{22} + 77x^{21} + 24x^{20} + 252x^{19} + 74x^{18} + 206x^{17} + 229x^{16} + 205x^{15} + 182x^{14} + 182x^{13} + 26x^{12} + 2x^{11}$

Step 3a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $115x^{23}$. Convert $115x^{23}$ to alpha notation. According to the log antilog table, for the integer value 115, the alpha exponent is 159. Therefore $115 = \alpha^{159}$. Multiply the generator polynomial by α^{159}:

$(\alpha^{159} * \alpha^{0})x^{23} + (\alpha^{159} * \alpha^{74})x^{22} + (\alpha^{159} * \alpha^{152})x^{21} + (\alpha^{159} * \alpha^{176})x^{20} + (\alpha^{159} * \alpha^{100})x^{19} + (\alpha^{159} * \alpha^{86})x^{18} + (\alpha^{159} * \alpha^{100})x^{17} + (\alpha^{159} * \alpha^{106})x^{16} + (\alpha^{159} * \alpha^{104})x^{15} + (\alpha^{159} * \alpha^{130})x^{14} + (\alpha^{159} * \alpha^{218})x^{13} + (\alpha^{159} * \alpha^{206})x^{12} + (\alpha^{159} * \alpha^{140})x^{11} + (\alpha^{159} * \alpha^{78})x^{10}$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{159}x^{23} + \alpha^{233}x^{22} + \alpha^{(311 \% 255)}x^{21} + \alpha^{(335 \% 255)}x^{20} + \alpha^{(259 \% 255)}x^{19} + \alpha^{245}x^{18} + \alpha^{(259 \% 255)}x^{17} + \alpha^{(265 \% 255)}x^{16} + \alpha^{(263 \% 255)}x^{15} + \alpha^{(289 \% 255)}x^{14} + \alpha^{(377 \% 255)}x^{13} + \alpha^{(365 \% 255)}x^{12} + \alpha^{(299 \% 255)}x^{11} + \alpha^{237}x^{10}$

The result is:

$\alpha^{159}x^{23} + \alpha^{233}x^{22} + \alpha^{56}x^{21} + \alpha^{80}x^{20} + \alpha^{4}x^{19} + \alpha^{245}x^{18} + \alpha^{4}x^{17} + \alpha^{10}x^{16} + \alpha^{8}x^{15} + \alpha^{34}x^{14} + \alpha^{122}x^{13} + \alpha^{110}x^{12} + \alpha^{44}x^{11} + \alpha^{237}x^{10}$

Now, convert this to integer notation:

$115x^{23} + 243x^{22} + 93x^{21} + 253x^{20} + 16x^{19} + 233x^{18} + 16x^{17} + 116x^{16} + 29x^{15} + 78x^{14} + 236x^{13} + 103x^{12} + 238x^{11} + 139x^{10}$

Step 3b: XOR the result with the result from step 2b

Use the result from step 2b to perform the next XOR.

$(115 \oplus 115)x^{23} + (70 \oplus 243)x^{22} + (77 \oplus 93)x^{21} + (24 \oplus 253)x^{20} + (252 \oplus 16)x^{19} + (74 \oplus 233)x^{18} + (206 \oplus 16)x^{17} + (229 \oplus 116)x^{16} + (205 \oplus 29)x^{15} + (182 \oplus 78)x^{14} + (182 \oplus 236)x^{13} + (26 \oplus 103)x^{12} + (2 \oplus 238)x^{11} + (0 \oplus 139)x^{10}$

The result is:

$0x^{23} + 181x^{22} + 16x^{21} + 229x^{20} + 236x^{19} + 163x^{18} + 222x^{17} + 145x^{16} + 208x^{15} + 248x^{14} + 90x^{13} + 125x^{12} + 236x^{11} + 139x^{10}$

Discard the lead 0 term to get:

$181x^{22} + 16x^{21} + 229x^{20} + 236x^{19} + 163x^{18} + 222x^{17} + 145x^{16} + 208x^{15} + 248x^{14} + 90x^{13} + 125x^{12} + 236x^{11} + 139x^{10}$

Step 4a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $181x^{22}$. Convert $181x^{22}$ to alpha notation. According to the log antilog table, for the integer value 181, the alpha exponent is 42. Therefore $181 = \alpha^{42}$. Multiply the generator polynomial by α^{42}:

$(\alpha^{42} * \alpha^{0})x^{22} + (\alpha^{42} * \alpha^{74})x^{21} + (\alpha^{42} * \alpha^{152})x^{20} + (\alpha^{42} * \alpha^{176})x^{19} + (\alpha^{42} * \alpha^{100})x^{18} + (\alpha^{42} * \alpha^{86})x^{17} + (\alpha^{42} * \alpha^{100})x^{16} + (\alpha^{42} * \alpha^{106})x^{15} + (\alpha^{42} * \alpha^{104})x^{14} + (\alpha^{42} * \alpha^{130})x^{13} + (\alpha^{42} * \alpha^{218})x^{12} + (\alpha^{42} * \alpha^{206})x^{11} + (\alpha^{42} * \alpha^{140})x^{10} + (\alpha^{42} * \alpha^{78})x^{9}$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{42}x^{22} + \alpha^{116}x^{21} + \alpha^{194}x^{20} + \alpha^{218}x^{19} + \alpha^{142}x^{18} + \alpha^{128}x^{17} + \alpha^{142}x^{16} + \alpha^{148}x^{15} + \alpha^{146}x^{14} + \alpha^{172}x^{13} + \alpha^{(260 \% 255)}x^{12} + \alpha^{248}x^{11} + \alpha^{182}x^{10} + \alpha^{120}x^{9}$

The result is:

$\alpha^{42}x^{22} + \alpha^{116}x^{21} + \alpha^{194}x^{20} + \alpha^{218}x^{19} + \alpha^{142}x^{18} + \alpha^{128}x^{17} + \alpha^{142}x^{16} + \alpha^{148}x^{15} + \alpha^{146}x^{14} + \alpha^{172}x^{13} + \alpha^{5}x^{12} + \alpha^{248}x^{11} + \alpha^{182}x^{10} + \alpha^{120}x^{9}$

Now, convert this to integer notation:

$181x^{22} + 248x^{21} + 50x^{20} + 43x^{19} + 42x^{18} + 133x^{17} + 42x^{16} + 82x^{15} + 154x^{14} + 123x^{13} + 32x^{12} + 27x^{11} + 98x^{10} + 59x^{9}$

Step 4b: XOR the result with the result from step 3b

Use the result from step 3b to perform the next XOR.

$(181 \oplus 181)x^{22} + (16 \oplus 248)x^{21} + (229 \oplus 50)x^{20} + (236 \oplus 43)x^{19} + (163 \oplus 42)x^{18} + (222 \oplus 133)x^{17} + (145 \oplus 42)x^{16} + (208 \oplus 82)x^{15} + (248 \oplus 154)x^{14} + (90 \oplus 123)x^{13} + (125 \oplus 32)x^{12} + (236 \oplus 27)x^{11} + (139 \oplus 98)x^{10} + (0 \oplus 59)x^{9}$

The result is:

$0x^{22} + 232x^{21} + 215x^{20} + 199x^{19} + 137x^{18} + 91x^{17} + 187x^{16} + 130x^{15} + 98x^{14} + 33x^{13} + 93x^{12} + 247x^{11} + 233x^{10} + 59x^{9}$

Discard the lead 0 term to get:

$232x^{21} + 215x^{20} + 199x^{19} + 137x^{18} + 91x^{17} + 187x^{16} + 130x^{15} + 98x^{14} + 33x^{13} + 93x^{12} + 247x^{11} + 233x^{10} + 59x^9$

Step 5a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $232x^{21}$. Convert $232x^{21}$ to alpha notation. According to the log antilog table, for the integer value 232, the alpha exponent is 11. Therefore $232 = \alpha^{11}$. Multiply the generator polynomial by α^{11}:

$(\alpha^{11} * \alpha^0)x^{21} + (\alpha^{11} * \alpha^{74})x^{20} + (\alpha^{11} * \alpha^{152})x^{19} + (\alpha^{11} * \alpha^{176})x^{18} + (\alpha^{11} * \alpha^{100})x^{17} + (\alpha^{11} * \alpha^{86})x^{16} + (\alpha^{11} * \alpha^{100})x^{15} + (\alpha^{11} * \alpha^{106})x^{14} + (\alpha^{11} * \alpha^{104})x^{13} + (\alpha^{11} * \alpha^{130})x^{12} + (\alpha^{11} * \alpha^{218})x^{11} + (\alpha^{11} * \alpha^{206})x^{10} + (\alpha^{11} * \alpha^{140})x^9 + (\alpha^{11} * \alpha^{78})x^8$

The exponents of the alphas are added together. The result is:

$\alpha^{11}x^{21} + \alpha^{85}x^{20} + \alpha^{163}x^{19} + \alpha^{187}x^{18} + \alpha^{111}x^{17} + \alpha^{97}x^{16} + \alpha^{111}x^{15} + \alpha^{117}x^{14} + \alpha^{115}x^{13} + \alpha^{141}x^{12} + \alpha^{229}x^{11} + \alpha^{217}x^{10} + \alpha^{151}x^9 + \alpha^{89}x^8$

Now, convert this to integer notation:

$232x^{21} + 214x^{20} + 99x^{19} + 220x^{18} + 206x^{17} + 175x^{16} + 206x^{15} + 237x^{14} + 124x^{13} + 21x^{12} + 122x^{11} + 155x^{10} + 170x^9 + 225x^8$

Step 5b: XOR the result with the result from step 4b

Use the result from step 4b to perform the next XOR.

$(232 \oplus 232)x^{21} + (215 \oplus 214)x^{20} + (199 \oplus 99)x^{19} + (137 \oplus 220)x^{18} + (91 \oplus 206)x^{17} + (187 \oplus 175)x^{16} + (130 \oplus 206)x^{15} + (98 \oplus 237)x^{14} + (33 \oplus 124)x^{13} + (93 \oplus 21)x^{12} + (247 \oplus 122)x^{11} + (233 \oplus 155)x^{10} + (59 \oplus 170)x^9 + (0 \oplus 225)x^8$

The result is:

$0x^{21} + 1x^{20} + 164x^{19} + 85x^{18} + 149x^{17} + 20x^{16} + 76x^{15} + 143x^{14} + 93x^{13} + 72x^{12} + 141x^{11} + 114x^{10} + 145x^9 + 225x^8$

Discard the lead 0 term to get:

$1x^{20} + 164x^{19} + 85x^{18} + 149x^{17} + 20x^{16} + 76x^{15} + 143x^{14} + 93x^{13} + 72x^{12} + 141x^{11} + 114x^{10} + 145x^9 + 225x^8$

Step 6a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $1x^{20}$. Convert $1x^{20}$ to alpha notation. According to the log antilog table, for the integer value 1, the alpha exponent is 0. Therefore $1 = \alpha^0$. Multiply the generator polynomial by α^0:

$(\alpha^0 * \alpha^0)x^{20} + (\alpha^0 * \alpha^{74})x^{19} + (\alpha^0 * \alpha^{152})x^{18} + (\alpha^0 * \alpha^{176})x^{17} + (\alpha^0 * \alpha^{100})x^{16} + (\alpha^0 * \alpha^{86})x^{15} + (\alpha^0 * \alpha^{100})x^{14} + (\alpha^0 * \alpha^{106})x^{13} + (\alpha^0 * \alpha^{104})x^{12} + (\alpha^0 * \alpha^{130})x^{11} + (\alpha^0 * \alpha^{218})x^{10} + (\alpha^0 * \alpha^{206})x^9 + (\alpha^0 * \alpha^{140})x^8 + (\alpha^0 * \alpha^{78})x^7$

The exponents of the alphas are added together. The result is:

$\alpha^{0}x^{20} + \alpha^{74}x^{19} + \alpha^{152}x^{18} + \alpha^{176}x^{17} + \alpha^{100}x^{16} + \alpha^{86}x^{15} + \alpha^{100}x^{14} + \alpha^{106}x^{13} + \alpha^{104}x^{12} + \alpha^{130}x^{11} + \alpha^{218}x^{10} + \alpha^{206}x^{9} + \alpha^{140}x^{8} + \alpha^{78}x^{7}$

Now, convert this to integer notation:

$1x^{20} + 137x^{19} + 73x^{18} + 227x^{17} + 17x^{16} + 177x^{15} + 17x^{14} + 52x^{13} + 13x^{12} + 46x^{11} + 43x^{10} + 83x^{9} + 132x^{8} + 120x^{7}$

Step 6b: XOR the result with the result from step 5b

Use the result from step 5b to perform the next XOR.

$(1 \oplus 1)x^{20} + (164 \oplus 137)x^{19} + (85 \oplus 73)x^{18} + (149 \oplus 227)x^{17} + (20 \oplus 17)x^{16} + (76 \oplus 177)x^{15} + (143 \oplus 17)x^{14} + (93 \oplus 52)x^{13} + (72 \oplus 13)x^{12} + (141 \oplus 46)x^{11} + (114 \oplus 43)x^{10} + (145 \oplus 83)x^{9} + (225 \oplus 132)x^{8} + (0 \oplus 120)x^{7}$

The result is:

$0x^{20} + 45x^{19} + 28x^{18} + 118x^{17} + 5x^{16} + 253x^{15} + 158x^{14} + 105x^{13} + 69x^{12} + 163x^{11} + 89x^{10} + 194x^{9} + 101x^{8} + 120x^{7}$

Discard the lead 0 term to get:

$45x^{19} + 28x^{18} + 118x^{17} + 5x^{16} + 253x^{15} + 158x^{14} + 105x^{13} + 69x^{12} + 163x^{11} + 89x^{10} + 194x^{9} + 101x^{8} + 120x^{7}$

Step 7a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $45x^{19}$. Convert $45x^{19}$ to alpha notation. According to the log antilog table, for the integer value 45, the alpha exponent is 18. Therefore $45 = \alpha^{18}$. Multiply the generator polynomial by α^{18}:

$(\alpha^{18} * \alpha^{0})x^{19} + (\alpha^{18} * \alpha^{74})x^{18} + (\alpha^{18} * \alpha^{152})x^{17} + (\alpha^{18} * \alpha^{176})x^{16} + (\alpha^{18} * \alpha^{100})x^{15} + (\alpha^{18} * \alpha^{86})x^{14} + (\alpha^{18} * \alpha^{100})x^{13} + (\alpha^{18} * \alpha^{106})x^{12} + (\alpha^{18} * \alpha^{104})x^{11} + (\alpha^{18} * \alpha^{130})x^{10} + (\alpha^{18} * \alpha^{218})x^{9} + (\alpha^{18} * \alpha^{206})x^{8} + (\alpha^{18} * \alpha^{140})x^{7} + (\alpha^{18} * \alpha^{78})x^{6}$

The exponents of the alphas are added together. The result is:

$\alpha^{18}x^{19} + \alpha^{92}x^{18} + \alpha^{170}x^{17} + \alpha^{194}x^{16} + \alpha^{118}x^{15} + \alpha^{104}x^{14} + \alpha^{118}x^{13} + \alpha^{124}x^{12} + \alpha^{122}x^{11} + \alpha^{148}x^{10} + \alpha^{236}x^{9} + \alpha^{224}x^{8} + \alpha^{158}x^{7} + \alpha^{96}x^{6}$

Now, convert this to integer notation:

$45x^{19} + 91x^{18} + 215x^{17} + 50x^{16} + 199x^{15} + 13x^{14} + 199x^{13} + 151x^{12} + 236x^{11} + 82x^{10} + 203x^{9} + 18x^{8} + 183x^{7} + 217x^{6}$

Step 7b: XOR the result with the result from step 6b

Use the result from step 6b to perform the next XOR.

$(45 \oplus 45)x^{19} + (28 \oplus 91)x^{18} + (118 \oplus 215)x^{17} + (5 \oplus 50)x^{16} + (253 \oplus 199)x^{15} + (158 \oplus 13)x^{14} + (105 \oplus 199)x^{13} + (69 \oplus 151)x^{12} + (163 \oplus 236)x^{11} + (89 \oplus 82)x^{10} + (194 \oplus 203)x^{9} + (101 \oplus 18)x^{8} + (120 \oplus 183)x^{7} + (0 \oplus 217)x^{6}$

The result is:

$0x^{19} + 71x^{18} + 161x^{17} + 55x^{16} + 58x^{15} + 147x^{14} + 174x^{13} + 210x^{12} + 79x^{11} + 11x^{10} + 9x^{9} + 119x^{8} + 207x^{7} + 217x^{6}$

Discard the lead 0 term to get:

$71x^{18} + 161x^{17} + 55x^{16} + 58x^{15} + 147x^{14} + 174x^{13} + 210x^{12} + 79x^{11} + 11x^{10} + 9x^{9} + 119x^{8} + 207x^{7} + 217x^{6}$

Step 8a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $71x^{18}$. Convert $71x^{18}$ to alpha notation. According to the log antilog table, for the integer value 71, the alpha exponent is 253. Therefore 71 = α^{253}. Multiply the generator polynomial by α^{253}:

$(\alpha^{253} * \alpha^{0})x^{18} + (\alpha^{253} * \alpha^{74})x^{17} + (\alpha^{253} * \alpha^{152})x^{16} + (\alpha^{253} * \alpha^{176})x^{15} + (\alpha^{253} * \alpha^{100})x^{14} + (\alpha^{253} * \alpha^{86})x^{13} + (\alpha^{253} * \alpha^{100})x^{12} + (\alpha^{253} * \alpha^{106})x^{11} + (\alpha^{253} * \alpha^{104})x^{10} + (\alpha^{253} * \alpha^{130})x^{9} + (\alpha^{253} * \alpha^{218})x^{8} + (\alpha^{253} * \alpha^{206})x^{7} + (\alpha^{253} * \alpha^{140})x^{6} + (\alpha^{253} * \alpha^{78})x^{5}$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{253}x^{18} + \alpha^{(327 \% 255)}x^{17} + \alpha^{(405 \% 255)}x^{16} + \alpha^{(429 \% 255)}x^{15} + \alpha^{(353 \% 255)}x^{14} + \alpha^{(339 \% 255)}x^{13} + \alpha^{(353 \% 255)}x^{12} + \alpha^{(359 \% 255)}x^{11} + \alpha^{(357 \% 255)}x^{10} + \alpha^{(383 \% 255)}x^{9} + \alpha^{(471 \% 255)}x^{8} + \alpha^{(459 \% 255)}x^{7} + \alpha^{(393 \% 255)}x^{6} + \alpha^{(331 \% 255)}x^{5}$

The result is:

$\alpha^{253}x^{18} + \alpha^{72}x^{17} + \alpha^{150}x^{16} + \alpha^{174}x^{15} + \alpha^{98}x^{14} + \alpha^{84}x^{13} + \alpha^{98}x^{12} + \alpha^{104}x^{11} + \alpha^{102}x^{10} + \alpha^{128}x^{9} + \alpha^{216}x^{8} + \alpha^{204}x^{7} + \alpha^{138}x^{6} + \alpha^{76}x^{5}$

Now, convert this to integer notation:

$71x^{18} + 101x^{17} + 85x^{16} + 241x^{15} + 67x^{14} + 107x^{13} + 67x^{12} + 13x^{11} + 68x^{10} + 133x^{9} + 195x^{8} + 221x^{7} + 33x^{6} + 30x^{5}$

Step 8b: XOR the result with the result from step 7b

Use the result from step 7b to perform the next XOR.

$(71 \oplus 71)x^{18} + (161 \oplus 101)x^{17} + (55 \oplus 85)x^{16} + (58 \oplus 241)x^{15} + (147 \oplus 67)x^{14} + (174 \oplus 107)x^{13} + (210 \oplus 67)x^{12} + (79 \oplus 13)x^{11} + (11 \oplus 68)x^{10} + (9 \oplus 133)x^{9} + (119 \oplus 195)x^{8} + (207 \oplus 221)x^{7} + (217 \oplus 33)x^{6} + (0 \oplus 30)x^{5}$

The result is:

$0x^{18} + 196x^{17} + 98x^{16} + 203x^{15} + 208x^{14} + 197x^{13} + 145x^{12} + 66x^{11} + 79x^{10} + 140x^{9} + 180x^{8} + 18x^{7} + 248x^{6} + 30x^{5}$

Discard the lead 0 term to get:

$196x^{17} + 98x^{16} + 203x^{15} + 208x^{14} + 197x^{13} + 145x^{12} + 66x^{11} + 79x^{10} + 140x^{9} + 180x^{8} + 18x^{7} + 248x^{6} + 30x^{5}$

Step 9a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $196x^{17}$. Convert $196x^{17}$ to alpha notation. According to the log antilog table, for the integer value 196, the alpha exponent is 183. Therefore $196 = \alpha^{183}$. Multiply the generator polynomial by α^{183}:

$(\alpha^{183} * \alpha^{0})x^{17} + (\alpha^{183} * \alpha^{74})x^{16} + (\alpha^{183} * \alpha^{152})x^{15} + (\alpha^{183} * \alpha^{176})x^{14} + (\alpha^{183} * \alpha^{100})x^{13} + (\alpha^{183} * \alpha^{86})x^{12} + (\alpha^{183} * \alpha^{100})x^{11} + (\alpha^{183} * \alpha^{106})x^{10} + (\alpha^{183} * \alpha^{104})x^{9} + (\alpha^{183} * \alpha^{130})x^{8} + (\alpha^{183} * \alpha^{218})x^{7} + (\alpha^{183} * \alpha^{206})x^{6} + (\alpha^{183} * \alpha^{140})x^{5} + (\alpha^{183} * \alpha^{78})x^{4}$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{183}x^{17} + \alpha^{(257 \% 255)}x^{16} + \alpha^{(335 \% 255)}x^{15} + \alpha^{(359 \% 255)}x^{14} + \alpha^{(283 \% 255)}x^{13} + \alpha^{(269 \% 255)}x^{12} + \alpha^{(283 \% 255)}x^{11} + \alpha^{(289 \% 255)}x^{10} + \alpha^{(287 \% 255)}x^{9} + \alpha^{(313 \% 255)}x^{8} + \alpha^{(401 \% 255)}x^{7} + \alpha^{(389 \% 255)}x^{6} + \alpha^{(323 \% 255)}x^{5} + \alpha^{(261 \% 255)}x^{4}$

The result is:

$\alpha^{183}x^{17} + \alpha^{2}x^{16} + \alpha^{80}x^{15} + \alpha^{104}x^{14} + \alpha^{28}x^{13} + \alpha^{14}x^{12} + \alpha^{28}x^{11} + \alpha^{34}x^{10} + \alpha^{32}x^{9} + \alpha^{58}x^{8} + \alpha^{146}x^{7} + \alpha^{134}x^{6} + \alpha^{68}x^{5} + \alpha^{6}x^{4}$

Now, convert this to integer notation:

$196x^{17} + 4x^{16} + 253x^{15} + 13x^{14} + 24x^{13} + 19x^{12} + 24x^{11} + 78x^{10} + 157x^{9} + 105x^{8} + 154x^{7} + 218x^{6} + 153x^{5} + 64x^{4}$

Step 9b: XOR the result with the result from step 8b

Use the result from step 8b to perform the next XOR.

$(196 \oplus 196)x^{17} + (98 \oplus 4)x^{16} + (203 \oplus 253)x^{15} + (208 \oplus 13)x^{14} + (197 \oplus 24)x^{13} + (145 \oplus 19)x^{12} + (66 \oplus 24)x^{11} + (79 \oplus 78)x^{10} + (140 \oplus 157)x^{9} + (180 \oplus 105)x^{8} + (18 \oplus 154)x^{7} + (248 \oplus 218)x^{6} + (30 \oplus 153)x^{5} + (0 \oplus 64)x^{4}$

The result is:

$0x^{17} + 102x^{16} + 54x^{15} + 221x^{14} + 221x^{13} + 130x^{12} + 90x^{11} + 1x^{10} + 17x^{9} + 221x^{8} + 136x^{7} + 34x^{6} + 135x^{5} + 64x^{4}$

Discard the lead 0 term to get:

$102x^{16} + 54x^{15} + 221x^{14} + 221x^{13} + 130x^{12} + 90x^{11} + 1x^{10} + 17x^{9} + 221x^{8} + 136x^{7} + 34x^{6} + 135x^{5} + 64x^{4}$

Step 10a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $102x^{16}$. Convert $102x^{16}$ to alpha notation. According to the log antilog table, for the integer value 102, the alpha exponent is 126. Therefore $102 = \alpha^{126}$. Multiply the generator polynomial by α^{126}:

$(\alpha^{126} * \alpha^{0})x^{16} + (\alpha^{126} * \alpha^{74})x^{15} + (\alpha^{126} * \alpha^{152})x^{14} + (\alpha^{126} * \alpha^{176})x^{13} + (\alpha^{126} * \alpha^{100})x^{12} + (\alpha^{126} * \alpha^{86})x^{11} + (\alpha^{126} * \alpha^{100})x^{10} + (\alpha^{126} * \alpha^{106})x^{9} + (\alpha^{126} * \alpha^{104})x^{8} + (\alpha^{126} * \alpha^{130})x^{7} + (\alpha^{126} * \alpha^{218})x^{6} + (\alpha^{126} * \alpha^{206})x^{5} + (\alpha^{126} * \alpha^{140})x^{4} + (\alpha^{126} * \alpha^{78})x^{3}$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{126}x^{16} + \alpha^{200}x^{15} + \alpha^{(278 \% 255)}x^{14} + \alpha^{(302 \% 255)}x^{13} + \alpha^{226}x^{12} + \alpha^{212}x^{11} + \alpha^{226}x^{10} + \alpha^{232}x^{9} + \alpha^{230}x^{8} + \alpha^{(256 \% 255)}x^{7} + \alpha^{(344 \% 255)}x^{6} + \alpha^{(332 \% 255)}x^{5} + \alpha^{(266 \% 255)}x^{4} + \alpha^{204}x^{3}$

The result is:

$\alpha^{126}x^{16} + \alpha^{200}x^{15} + \alpha^{23}x^{14} + \alpha^{47}x^{13} + \alpha^{226}x^{12} + \alpha^{212}x^{11} + \alpha^{226}x^{10} + \alpha^{232}x^{9} + \alpha^{230}x^{8} + \alpha^{1}x^{7} + \alpha^{89}x^{6} + \alpha^{77}x^{5} + \alpha^{11}x^{4} + \alpha^{204}x^{3}$

Now, convert this to integer notation:

$102x^{16} + 28x^{15} + 201x^{14} + 35x^{13} + 72x^{12} + 121x^{11} + 72x^{10} + 247x^{9} + 244x^{8} + 2x^{7} + 225x^{6} + 60x^{5} + 232x^{4} + 221x^{3}$

Step 10b: XOR the result with the result from step 9b

Use the result from step 9b to perform the next XOR.

$(102 \oplus 102)x^{16} + (54 \oplus 28)x^{15} + (221 \oplus 201)x^{14} + (221 \oplus 35)x^{13} + (130 \oplus 72)x^{12} + (90 \oplus 121)x^{11} + (1 \oplus 72)x^{10} + (17 \oplus 247)x^{9} + (221 \oplus 244)x^{8} + (136 \oplus 2)x^{7} + (34 \oplus 225)x^{6} + (135 \oplus 60)x^{5} + (64 \oplus 232)x^{4} + (0 \oplus 221)x^{3}$

The result is:

$0x^{16} + 42x^{15} + 20x^{14} + 254x^{13} + 202x^{12} + 35x^{11} + 73x^{10} + 230x^{9} + 41x^{8} + 138x^{7} + 195x^{6} + 187x^{5} + 168x^{4} + 221x^{3}$

Discard the lead 0 term to get:

$42x^{15} + 20x^{14} + 254x^{13} + 202x^{12} + 35x^{11} + 73x^{10} + 230x^{9} + 41x^{8} + 138x^{7} + 195x^{6} + 187x^{5} + 168x^{4} + 221x^{3}$

Step 11a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $42x^{15}$. Convert $42x^{15}$ to alpha notation. According to the log antilog table, for the integer value 42, the alpha exponent is 142. Therefore $42 = \alpha^{142}$. Multiply the generator polynomial by α^{142}:

$(\alpha^{142} * \alpha^{0})x^{15} + (\alpha^{142} * \alpha^{74})x^{14} + (\alpha^{142} * \alpha^{152})x^{13} + (\alpha^{142} * \alpha^{176})x^{12} + (\alpha^{142} * \alpha^{100})x^{11} + (\alpha^{142} * \alpha^{86})x^{10} + (\alpha^{142} * \alpha^{100})x^{9} + (\alpha^{142} * \alpha^{106})x^{8} + (\alpha^{142} * \alpha^{104})x^{7} + (\alpha^{142} * \alpha^{130})x^{6} + (\alpha^{142} * \alpha^{218})x^{5} + (\alpha^{142} * \alpha^{206})x^{4} + (\alpha^{142} * \alpha^{140})x^{3} + (\alpha^{142} * \alpha^{78})x^{2}$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{142}x^{15} + \alpha^{216}x^{14} + \alpha^{(294 \% 255)}x^{13} + \alpha^{(318 \% 255)}x^{12} + \alpha^{242}x^{11} + \alpha^{228}x^{10} + \alpha^{242}x^{9} + \alpha^{248}x^{8} + \alpha^{246}x^{7} + \alpha^{(272 \% 255)}x^{6} + \alpha^{(360 \% 255)}x^{5} + \alpha^{(348 \% 255)}x^{4} + \alpha^{(282 \% 255)}x^{3} + \alpha^{220}x^{2}$

The result is:

$\alpha^{142}x^{15} + \alpha^{216}x^{14} + \alpha^{39}x^{13} + \alpha^{63}x^{12} + \alpha^{242}x^{11} + \alpha^{228}x^{10} + \alpha^{242}x^{9} + \alpha^{248}x^{8} + \alpha^{246}x^{7} + \alpha^{17}x^{6} + \alpha^{105}x^{5} + \alpha^{93}x^{4} + \alpha^{27}x^{3} + \alpha^{220}x^{2}$

Now, convert this to integer notation:

$42x^{15} + 195x^{14} + 53x^{13} + 161x^{12} + 176x^{11} + 61x^{10} + 176x^9 + 27x^8 + 207x^7 + 152x^6 + 26x^5 + 182x^4 + 12x^3 + 172x^2$

Step 11b: XOR the result with the result from step 10b

Use the result from step 10b to perform the next XOR.

$(42 \oplus 42)x^{15} + (20 \oplus 195)x^{14} + (254 \oplus 53)x^{13} + (202 \oplus 161)x^{12} + (35 \oplus 176)x^{11} + (73 \oplus 61)x^{10} + (230 \oplus 176)x^9 + (41 \oplus 27)x^8 + (138 \oplus 207)x^7 + (195 \oplus 152)x^6 + (187 \oplus 26)x^5 + (168 \oplus 182)x^4 + (221 \oplus 12)x^3 + (0 \oplus 172)x^2$

The result is:

$0x^{15} + 215x^{14} + 203x^{13} + 107x^{12} + 147x^{11} + 116x^{10} + 86x^9 + 50x^8 + 69x^7 + 91x^6 + 161x^5 + 30x^4 + 209x^3 + 172x^2$

Discard the lead 0 term to get:

$215x^{14} + 203x^{13} + 107x^{12} + 147x^{11} + 116x^{10} + 86x^9 + 50x^8 + 69x^7 + 91x^6 + 161x^5 + 30x^4 + 209x^3 + 172x^2$

Step 12a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $215x^{14}$. Convert $215x^{14}$ to alpha notation. According to the log antilog table, for the integer value 215, the alpha exponent is 170. Therefore 215 = α^{170}. Multiply the generator polynomial by α^{170}:

$(\alpha^{170} * \alpha^0)x^{14} + (\alpha^{170} * \alpha^{74})x^{13} + (\alpha^{170} * \alpha^{152})x^{12} + (\alpha^{170} * \alpha^{176})x^{11} + (\alpha^{170} * \alpha^{100})x^{10} + (\alpha^{170} * \alpha^{86})x^9 + (\alpha^{170} * \alpha^{100})x^8 + (\alpha^{170} * \alpha^{106})x^7 + (\alpha^{170} * \alpha^{104})x^6 + (\alpha^{170} * \alpha^{130})x^5 + (\alpha^{170} * \alpha^{218})x^4 + (\alpha^{170} * \alpha^{206})x^3 + (\alpha^{170} * \alpha^{140})x^2 + (\alpha^{170} * \alpha^{78})x^1$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{170}x^{14} + \alpha^{244}x^{13} + \alpha^{(322 \% 255)}x^{12} + \alpha^{(346 \% 255)}x^{11} + \alpha^{(270 \% 255)}x^{10} + \alpha^{(256 \% 255)}x^9 + \alpha^{(270 \% 255)}x^8 + \alpha^{(276 \% 255)}x^7 + \alpha^{(274 \% 255)}x^6 + \alpha^{(300 \% 255)}x^5 + \alpha^{(388 \% 255)}x^4 + \alpha^{(376 \% 255)}x^3 + \alpha^{(310 \% 255)}x^2 + \alpha^{248}x^1$

The result is:

$\alpha^{170}x^{14} + \alpha^{244}x^{13} + \alpha^{67}x^{12} + \alpha^{91}x^{11} + \alpha^{15}x^{10} + \alpha^1x^9 + \alpha^{15}x^8 + \alpha^{21}x^7 + \alpha^{19}x^6 + \alpha^{45}x^5 + \alpha^{133}x^4 + \alpha^{121}x^3 + \alpha^{55}x^2 + \alpha^{248}x^1$

Now, convert this to integer notation:

$215x^{14} + 250x^{13} + 194x^{12} + 163x^{11} + 38x^{10} + 2x^9 + 38x^8 + 117x^7 + 90x^6 + 193x^5 + 109x^4 + 118x^3 + 160x^2 + 27x^1$

Step 12b: XOR the result with the result from step 11b

Use the result from step 11b to perform the next XOR.

$(215 \oplus 215)x^{14} + (203 \oplus 250)x^{13} + (107 \oplus 194)x^{12} + (147 \oplus 163)x^{11} + (116 \oplus 38)x^{10} + (86 \oplus 2)x^9 + (50 \oplus 38)x^8 + (69 \oplus 117)x^7 + (91 \oplus 90)x^6 + (161 \oplus 193)x^5 + (30 \oplus 109)x^4 + (209 \oplus 118)x^3 + (172 \oplus 160)x^2 + (0 \oplus 27)x^1$

The result is:

$0x^{14} + 49x^{13} + 169x^{12} + 48x^{11} + 82x^{10} + 84x^9 + 20x^8 + 48x^7 + 1x^6 + 96x^5 + 115x^4 + 167x^3 + 12x^2 + 27x^1$

Discard the lead 0 term to get:

$49x^{13} + 169x^{12} + 48x^{11} + 82x^{10} + 84x^9 + 20x^8 + 48x^7 + 1x^6 + 96x^5 + 115x^4 + 167x^3 + 12x^2 + 27x^1$

Step 13a: Multiply the Generator Polynomial by the Lead Term of the XOR result from the previous step

Next, multiply the generator polynomial by the lead term of the XOR result from the previous step. The lead term in this case is $49x^{13}$. Convert $49x^{13}$ to alpha notation. According to the log antilog table, for the integer value 49, the alpha exponent is 181. Therefore $49 = \alpha^{181}$. Multiply the generator polynomial by α^{181}:

$(\alpha^{181} * \alpha^0)x^{13} + (\alpha^{181} * \alpha^{74})x^{12} + (\alpha^{181} * \alpha^{152})x^{11} + (\alpha^{181} * \alpha^{176})x^{10} + (\alpha^{181} * \alpha^{100})x^9 + (\alpha^{181} * \alpha^{86})x^8 + (\alpha^{181} * \alpha^{100})x^7 + (\alpha^{181} * \alpha^{106})x^6 + (\alpha^{181} * \alpha^{104})x^5 + (\alpha^{181} * \alpha^{130})x^4 + (\alpha^{181} * \alpha^{218})x^3 + (\alpha^{181} * \alpha^{206})x^2 + (\alpha^{181} * \alpha^{140})x^1 + (\alpha^{181} * \alpha^{78})x^0$

The exponents of the alphas are added together. In this case, at least one of the exponents is larger than 255, so perform modulo 255 as follows:

$\alpha^{181}x^{13} + \alpha^{255}x^{12} + \alpha^{(333 \% 255)}x^{11} + \alpha^{(357 \% 255)}x^{10} + \alpha^{(281 \% 255)}x^9 + \alpha^{(267 \% 255)}x^8 + \alpha^{(281 \% 255)}x^7 + \alpha^{(287 \% 255)}x^6 + \alpha^{(285 \% 255)}x^5 + \alpha^{(311 \% 255)}x^4 + \alpha^{(399 \% 255)}x^3 + \alpha^{(387 \% 255)}x^2 + \alpha^{(321 \% 255)}x^1 + \alpha^{(259 \% 255)}x^0$

The result is:

$\alpha^{181}x^{13} + \alpha^0x^{12} + \alpha^{78}x^{11} + \alpha^{102}x^{10} + \alpha^{26}x^9 + \alpha^{12}x^8 + \alpha^{26}x^7 + \alpha^{32}x^6 + \alpha^{30}x^5 + \alpha^{56}x^4 + \alpha^{144}x^3 + \alpha^{132}x^2 + \alpha^{66}x^1 + \alpha^4x^0$

Now, convert this to integer notation:

$49x^{13} + 1x^{12} + 120x^{11} + 68x^{10} + 6x^9 + 205x^8 + 6x^7 + 157x^6 + 96x^5 + 93x^4 + 168x^3 + 184x^2 + 97x^1 + 16$

Step 13b: XOR the result with the result from step 12b

Use the result from step 12b to perform the next XOR.

$(49 \oplus 49)x^{13} + (169 \oplus 1)x^{12} + (48 \oplus 120)x^{11} + (82 \oplus 68)x^{10} + (84 \oplus 6)x^9 + (20 \oplus 205)x^8 + (48 \oplus 6)x^7 + (1 \oplus 157)x^6 + (96 \oplus 96)x^5 + (115 \oplus 93)x^4 + (167 \oplus 168)x^3 + (12 \oplus 184)x^2 + (27 \oplus 97)x^1 + (0 \oplus 16)x^0$

The result is:

$0x^{13} + 168x^{12} + 72x^{11} + 22x^{10} + 82x^9 + 217x^8 + 54x^7 + 156x^6 + 0x^5 + 46x^4 + 15x^3 + 180x^2 + 122x^1 + 16$

Discard the lead 0 term to get:

$168x^{12} + 72x^{11} + 22x^{10} + 82x^9 + 217x^8 + 54x^7 + 156x^6 + 0x^5 + 46x^4 + 15x^3 + 180x^2 + 122x^1 + 16$

Use the terms of the remainder as the error correction codewords

The division has been performed 13 times, which is the number of terms in the message polynomial. This means that the division is complete and the terms of the above polynomial are the error correction codewords to use for the original message polynomial:

168 72 22 82 217 54 156 0 46 15 180 122 16

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