D[16 x^2 - 250 x + 1015, x]

$-250 + 32\,x$

250 / 32 // N

7.8125

16 x^2 - 250 x + 1015 /. x → 9

61

(49 / 13)^13 - 16^6 // N

1.42173×10^{7}

(61 / 16)^16 - 4^15 // N

9.18571×10^{8}

feasiblefactorlist[41, (x + 5)^25 (x - 7)^12]

$\{(-12+x)\,(-11+x)\,(-9+x)^2,\ (-11+x)^3\,(-8+x)\}$

length 2

feasiblefactorlist[41, (x + 5)^25 (x - 7)^11]

$\{(-13+x)\,(-9+x)^3\,(-8+x),\ (-9+x)^2\,(-932+293\,x-30\,x^2+x^3),$
$(-9+x)^2\,(-928+293\,x-30\,x^2+x^3),\ (-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x),$
$(-11+x)^3\,(-8+x)\,(-7+x),\ (-11+x)^2\,(-9+x)\,(68-17\,x+x^2)\}$

length 6

feasiblefactorlist[41, (x + 5)^25 (x - 7)^10]

$\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x),$
$(-9+x)^2\,(-7+x)\,(-932+293\,x-30\,x^2+x^3),\ (-9+x)^4\,(80-19\,x+x^2),$
$(-9+x)^2\,(-7+x)\,(-928+293\,x-30\,x^2+x^3),\ (-9+x)^2\,(6452-2975\,x+503\,x^2-37\,x^3+x^4),$
$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^2,\ (-9+x)^3\,(-712+251\,x-28\,x^2+x^3),$
$(-11+x)\,(-9+x)^2\,(-8+x)\,(73-18\,x+x^2),\ (-11+x)^3\,(-8+x)\,(-7+x)^2,$
$(-11+x)\,(-9+x)^2\,(-580+217\,x-26\,x^2+x^3),\ (-11+x)^2\,(-9+x)\,(-7+x)\,(68-17\,x+x^2),$
$(-11+x)\,(-9+x)^3\,(64-17\,x+x^2),\ (-11+x)^2\,(-9+x)^2\,(52-15\,x+x^2)\}$

length 13

feasiblefactorlist[41, (x + 5) ^ 25 (x - 7) ^ 9]

$$\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x)^2,\ (-9+x)^2\,(-7+x)^2\,\left(-932+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)\,\left(80-19\,x+x^2\right),\ (-9+x)^2\,(-7+x)^2\,\left(-928+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,\left(-556+213\,x-26\,x^2+x^3\right),\ (-9+x)^2\,(-7+x)\,\left(6452-2975\,x+503\,x^2-37\,x^3+x^4\right),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^3,\ (-9+x)^4\,(-8+x)\,\left(69-18\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)\,\left(-712+251\,x-28\,x^2+x^3\right),$$
$$(-9+x)^2\,(-8+x)\,\left(95-20\,x+x^2\right)\,\left(59-16\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)\,\left(73-18\,x+x^2\right),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^3,\ (-9+x)^4\,\left(-548+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),\ (-9+x)^3\,\left(73-18\,x+x^2\right)\,\left(68-17\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-11+x)^2\,(-9+x)\,(-7+x)^2\,\left(68-17\,x+x^2\right),\ (-9+x)^4\,\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,\left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^2\,\left(59-16\,x+x^2\right)\,\left(-752+255\,x-28\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)\,\left(64-17\,x+x^2\right),\ (-12+x)\,(-9+x)^5\,(-5+x),$$
$$(-9+x)^3\,\left(4876-2457\,x+447\,x^2-35\,x^3+x^4\right),\ (-11+x)^2\,(-9+x)^2\,(-7+x)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,\left(-536+213\,x-26\,x^2+x^3\right),\ (-11+x)^2\,(-9+x)^3\,(-8+x)\,(-5+x),$$
$$(-9+x)^4\,\left(-532+213\,x-26\,x^2+x^3\right),\ (-11+x)\,(-9+x)^4\,\left(48-15\,x+x^2\right)\}$$

length 28

feasiblefactorlist[41, (x + 5) ^ 25 (x - 7) ^ 8]

$$\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x)^3,$$
$$(-9+x)^2\,(-7+x)^3\,(-932+293\,x-30\,x^2+x^3),\ (-9+x)^4\,(-7+x)^2\,(80-19\,x+x^2),$$
$$(-9+x)^2\,(-7+x)^3\,(-928+293\,x-30\,x^2+x^3),\ (-9+x)^4\,(-7+x)\,(-556+213\,x-26\,x^2+x^3),$$
$$(-9+x)^2\,(-7+x)^2\,(6452-2975\,x+503\,x^2-37\,x^3+x^4),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^4,\ (-9+x)^4\,(-8+x)\,(-7+x)\,(69-18\,x+x^2),$$
$$(-9+x)^3\,(-7+x)^2\,(-712+251\,x-28\,x^2+x^3),$$
$$(-9+x)^2\,(-8+x)\,(-7+x)\,(95-20\,x+x^2)\,(59-16\,x+x^2),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^2\,(73-18\,x+x^2),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^4,\ (-9+x)^4\,(-7+x)\,(-548+213\,x-26\,x^2+x^3),$$
$$(-9+x)^3\,(-7+x)\,(4948-2465\,x+447\,x^2-35\,x^3+x^4),$$
$$(-9+x)^3\,(-7+x)\,(73-18\,x+x^2)\,(68-17\,x+x^2),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)^2\,(-580+217\,x-26\,x^2+x^3),$$
$$(-11+x)^2\,(-9+x)\,(-7+x)^3\,(68-17\,x+x^2),\ (-9+x)^4\,(-7+x)\,(-544+213\,x-26\,x^2+x^3),$$
$$(-9+x)^3\,(-7+x)\,(4912-2461\,x+447\,x^2-35\,x^3+x^4),$$
$$(-9+x)^2\,(-7+x)\,(59-16\,x+x^2)\,(-752+255\,x-28\,x^2+x^3),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^2\,(64-17\,x+x^2),$$
$$(-12+x)\,(-9+x)^5\,(-7+x)\,(-5+x),\ (-9+x)^4\,(73-18\,x+x^2)\,(52-15\,x+x^2),$$
$$(-9+x)^3\,(-7+x)\,(4876-2457\,x+447\,x^2-35\,x^3+x^4),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^2\,(52-15\,x+x^2),\ (-9+x)^4\,(-8+x)\,(-467+195\,x-25\,x^2+x^3),$$
$$(-9+x)^4\,(-7+x)\,(-536+213\,x-26\,x^2+x^3),\ (-9+x)^4\,(3768-2027\,x+395\,x^2-33\,x^3+x^4),$$
$$(-11+x)^2\,(-9+x)^3\,(-8+x)\,(-7+x)\,(-5+x),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(59-16\,x+x^2)^2,\ (-9+x)^5\,(-412+179\,x-24\,x^2+x^3),$$
$$(-9+x)^4\,(-7+x)\,(-532+213\,x-26\,x^2+x^3),\ (-11+x)\,(-9+x)^4\,(-5+x)\,(68-17\,x+x^2),$$
$$(-9+x)^4\,(3680-2019\,x+395\,x^2-33\,x^3+x^4),\ (-11+x)\,(-9+x)^4\,(-7+x)\,(48-15\,x+x^2),$$
$$(-9+x)^5\,(-404+179\,x-24\,x^2+x^3),\ (-11+x)\,(-9+x)^4\,(-332+153\,x-22\,x^2+x^3),$$
$$(-11+x)\,(-9+x)^4\,(-8+x)\,(41-14\,x+x^2),\ (-11+x)\,(-9+x)^6\,(-4+x)\}$$

length 39

feasiblefactorlist[41, (x + 5) ^ 25 (x - 7) ^ 7]

$$\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x)^4,\ (-9+x)^2\,(-7+x)^4\,(-932+293\,x-30\,x^2+x^3),$$
$$(-9+x)^4\,(-7+x)^3\,(80-19\,x+x^2),\ (-9+x)^2\,(-7+x)^4\,(-928+293\,x-30\,x^2+x^3),$$
$$(-9+x)^4\,(-7+x)^2\,(-556+213\,x-26\,x^2+x^3),$$
$$(-9+x)^2\,(-7+x)^3\,(6452-2975\,x+503\,x^2-37\,x^3+x^4),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^5,\ (-9+x)^4\,(-8+x)\,(-7+x)^2\,(69-18\,x+x^2),$$
$$(-9+x)^3\,(-7+x)^3\,(-712+251\,x-28\,x^2+x^3),$$
$$(-9+x)^2\,(-8+x)\,(-7+x)^2\,(95-20\,x+x^2)\,(59-16\,x+x^2),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^3\,(73-18\,x+x^2),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^5,\ (-9+x)^4\,(-7+x)^2\,(-548+213\,x-26\,x^2+x^3),$$

$$(-9+x)^3\,(-7+x)^2\,\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^3\,(-7+x)^2\,\left(73-18\,x+x^2\right)\,\left(68-17\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)^3\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-11+x)^2\,(-9+x)\,(-7+x)^4\,\left(68-17\,x+x^2\right),\ (-9+x)^4\,(-7+x)^2\,\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^2\,\left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^2\,(-7+x)^2\,\left(59-16\,x+x^2\right)\,\left(-752+255\,x-28\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^3\,\left(64-17\,x+x^2\right),\ (-12+x)\,(-9+x)^5\,(-7+x)^2\,(-5+x),$$
$$(-9+x)^4\,(-7+x)\,\left(73-18\,x+x^2\right)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^2\,\left(4876-2457\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^3\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-8+x)\,(-7+x)\,\left(-467+195\,x-25\,x^2+x^3\right),$$
$$(-9+x)^5\,(-8+x)\,(-5+x)\,\left(73-18\,x+x^2\right),\ (-9+x)^4\,(-7+x)^2\,\left(-536+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)\,\left(3768-2027\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^3\,(-8+x)\,(-7+x)^2\,(-5+x),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)\,\left(-412+179\,x-24\,x^2+x^3\right),\ (-9+x)^5\,(-5+x)\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,\left(-26\,084+17\,885\,x-4788\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(-532+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,\left(59-16\,x+x^2\right)\,\left(-444+183\,x-24\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)\,(-5+x)\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^3\,\left(68-17\,x+x^2\right)\,\left(59-16\,x+x^2\right)^2,\ (-9+x)^5\,\left(2864-1661\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)\,\left(3680-2019\,x+395\,x^2-33\,x^3+x^4\right),\ (-9+x)^6\,(-5+x)\,\left(64-17\,x+x^2\right),$$
$$(-9+x)^4\,\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,\left(-25\,888+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^2\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^5\,(-7+x)\,\left(-404+179\,x-24\,x^2+x^3\right),\ (-9+x)^6\,\left(-316+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^4\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^5\,(-5+x)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,\left(59-16\,x+x^2\right)\,\left(-436+183\,x-24\,x^2+x^3\right),$$
$$(-9+x)^5\,(-8+x)\,\left(-349+163\,x-23\,x^2+x^3\right),\ (-9+x)^6\,\left(-312+149\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-8+x)\,(-7+x)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^5\,\left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),\ (-11+x)\,(-9+x)^6\,(-7+x)\,(-4+x),$$
$$(-9+x)^5\,\left(68-17\,x+x^2\right)\,\left(41-14\,x+x^2\right),\ (-9+x)^6\,\left(-304+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,\left(-300+149\,x-22\,x^2+x^3\right),\ (-9+x)^6\,(-8+x)\,\left(37-14\,x+x^2\right),$$
$$(-9+x)^6\,\left(-292+149\,x-22\,x^2+x^3\right),\ (-9+x)^7\,\left(32-13\,x+x^2\right)\Big\}$$

length 61

feasiblefactorlist[41, (x + 5) ^ 25 (x - 7) ^ 6]

$$\Big\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x)^5,\ (-9+x)^2\,(-7+x)^5\,\left(-932+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(80-19\,x+x^2\right),\ (-9+x)^2\,(-7+x)^5\,\left(-928+293\,x-30\,x^2+x^3\right),$$

$$(-9+x)^4\,(-7+x)^3\,\left(-556+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^2\,(-7+x)^4\,\left(6452-2975\,x+503\,x^2-37\,x^3+x^4\right),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^6,\ (-9+x)^4\,(-8+x)\,(-7+x)^3\,\left(69-18\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^4\,\left(-712+251\,x-28\,x^2+x^3\right),$$
$$(-9+x)^2\,(-8+x)\,(-7+x)^3\,\left(95-20\,x+x^2\right)\,\left(59-16\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^4\,\left(73-18\,x+x^2\right),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^6,\ (-9+x)^4\,(-7+x)^3\,\left(-548+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^3\,\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^3\,(-7+x)^3\,\left(73-18\,x+x^2\right)\,\left(68-17\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)^4\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-11+x)^2\,(-9+x)\,(-7+x)^5\,\left(68-17\,x+x^2\right),\ (-9+x)^4\,(-7+x)^3\,\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^3\,\left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^2\,(-7+x)^3\,\left(59-16\,x+x^2\right)\,\left(-752+255\,x-28\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^4\,\left(64-17\,x+x^2\right),\ (-12+x)\,(-9+x)^5\,(-7+x)^3\,(-5+x),$$
$$(-9+x)^4\,(-7+x)^2\,\left(73-18\,x+x^2\right)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^3\,\left(4876-2457\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^4\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-8+x)\,(-7+x)^2\,\left(-467+195\,x-25\,x^2+x^3\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)\,(-5+x)\,\left(73-18\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^3\,\left(-536+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(3768-2027\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^3\,(-8+x)\,(-7+x)^3\,(-5+x),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^2\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^2\,\left(-412+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^5\,(-7+x)\,(-5+x)\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)\,\left(-26\,084+17\,885\,x-4788\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^3\,\left(-532+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)\,\left(59-16\,x+x^2\right)\,\left(-444+183\,x-24\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^2\,(-5+x)\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)\,\left(68-17\,x+x^2\right)\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)\,\left(2864-1661\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(3680-2019\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-9+x)^6\,(-7+x)\,(-5+x)\,\left(64-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)\,\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)\,\left(-25\,888+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^3\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^5\,(-7+x)^2\,\left(-404+179\,x-24\,x^2+x^3\right),\ (-9+x)^6\,(-7+x)\,\left(-316+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^2\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^5\,(-7+x)\,(-5+x)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)\,\left(59-16\,x+x^2\right)\,\left(-436+183\,x-24\,x^2+x^3\right),$$
$$(-9+x)^4\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right),$$

$$(-9+x)^5\,(-8+x)\,(-7+x)\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)\,\left(-312+149\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-8+x)\,(-7+x)^2\,\left(41-14\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^6\,(-8+x)\,(-5+x)^2,$$
$$(-9+x)^5\,(-7+x)\,\left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-11+x)\,(-9+x)^6\,(-7+x)^2\,(-4+x),\ (-9+x)^6\,\left(2172-1351\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^5\,(-7+x)\,\left(68-17\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)\,\left(-304+149\,x-22\,x^2+x^3\right),\ (-9+x)^6\,\left(2144-1347\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\,(-5+x)\,\left(48-15\,x+x^2\right),\ (-9+x)^6\,(-7+x)\,\left(-300+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,\left(2116-1343\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^6\,\left(52-15\,x+x^2\right)\,\left(41-14\,x+x^2\right),\ (-9+x)^6\,(-8+x)\,(-7+x)\,\left(37-14\,x+x^2\right),$$
$$(-9+x)^7\,\left(-232+123\,x-20\,x^2+x^3\right),\ (-9+x)^6\,(-7+x)\,\left(-292+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^7\,(-7+x)\,\left(32-13\,x+x^2\right),\ (-9+x)^8\,(-8+x)\,(-3+x)\Big\}$$

length 70

feasiblefactorlist[41, (x + 5) ^ 25 (x - 7) ^ 5]

$$\Big\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x)^6,\ (-9+x)^2\,(-7+x)^6\,\left(-932+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^5\,\left(80-19\,x+x^2\right),\ (-9+x)^2\,(-7+x)^6\,\left(-928+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(-556+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^2\,(-7+x)^5\,\left(6452-2975\,x+503\,x^2-37\,x^3+x^4\right),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^7,\ (-9+x)^4\,(-8+x)\,(-7+x)^4\,\left(69-18\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^5\,\left(-712+251\,x-28\,x^2+x^3\right),$$
$$(-9+x)^2\,(-8+x)\,(-7+x)^4\,\left(95-20\,x+x^2\right)\,\left(59-16\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^5\,\left(73-18\,x+x^2\right),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^7,\ (-9+x)^4\,(-7+x)^4\,\left(-548+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^4\,\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^3\,(-7+x)^4\,\left(73-18\,x+x^2\right)\,\left(68-17\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)^5\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-11+x)^2\,(-9+x)\,(-7+x)^6\,\left(68-17\,x+x^2\right),\ (-9+x)^4\,(-7+x)^4\,\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^4\,\left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^2\,(-7+x)^4\,\left(59-16\,x+x^2\right)\,\left(-752+255\,x-28\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^5\,\left(64-17\,x+x^2\right),\ (-12+x)\,(-9+x)^5\,(-7+x)^4\,(-5+x),$$
$$(-9+x)^4\,(-7+x)^3\,\left(73-18\,x+x^2\right)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^4\,\left(4876-2457\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^5\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-8+x)\,(-7+x)^3\,\left(-467+195\,x-25\,x^2+x^3\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^2\,(-5+x)\,\left(73-18\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(-536+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^3\,\left(3768-2027\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^3\,(-8+x)\,(-7+x)^4\,(-5+x),$$

$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^3\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^3\,\left(-412+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^5\,(-7+x)^2\,(-5+x)\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(-26\,084+17\,885\,x-4788\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(-532+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(59-16\,x+x^2\right)\,\left(-444+183\,x-24\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^3\,(-5+x)\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^2\,\left(68-17\,x+x^2\right)\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^2\,\left(2864-1661\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)^3\,\left(3680-2019\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-9+x)^6\,(-7+x)^2\,(-5+x)\,\left(64-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(-25\,888+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^4\,\left(48-15\,x+x^2\right),\ (-9+x)^5\,(-7+x)^3\,\left(-404+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^2\,\left(-316+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^3\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^5\,(-7+x)^2\,(-5+x)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(59-16\,x+x^2\right)\,\left(-436+183\,x-24\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^2\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^2\,\left(-312+149\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-8+x)\,(-7+x)^3\,\left(41-14\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^6\,(-8+x)\,(-7+x)\,(-5+x)^2,$$
$$(-9+x)^5\,(-7+x)^2\,\left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^5\,(-8+x)\,(-5+x)\,\left(59-16\,x+x^2\right)^2,\ (-11+x)\,(-9+x)^6\,(-7+x)^3\,(-4+x),$$
$$(-9+x)^6\,(-7+x)\,\left(2172-1351\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^5\,(-7+x)^2\,\left(68-17\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^7\,(-5+x)^2\,\left(68-17\,x+x^2\right),\ (-9+x)^6\,(-7+x)^2\,\left(-304+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)\,\left(2144-1347\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\,(-7+x)\,(-5+x)\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^6\,\left(59-16\,x+x^2\right)\,\left(-256+127\,x-20\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^2\,\left(-300+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)\,\left(2116-1343\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\,(-5+x)\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)\,\left(52-15\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^6\,(-8+x)\,(-7+x)^2\,\left(37-14\,x+x^2\right),$$
$$(-9+x)^6\,(-8+x)\,\left(59-16\,x+x^2\right)\,\left(31-12\,x+x^2\right),$$
$$(-9+x)^7\,(-7+x)\,\left(-232+123\,x-20\,x^2+x^3\right),\ (-9+x)^7\,(-8+x)\,(-5+x)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)^2\,\left(-292+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^7\,\left(1604-1089\,x+263\,x^2-27\,x^3+x^4\right),\ (-9+x)^9\,(-5+x)\,(-4+x),$$
$$(-9+x)^7\,(-7+x)^2\,\left(32-13\,x+x^2\right),\ (-9+x)^8\,\left(-176+101\,x-18\,x^2+x^3\right),$$

$$(-9+x)^8\left(-172+101\,x-18\,x^2+x^3\right),\ (-9+x)^8\,(-8+x)\,(-7+x)\,(-3+x)\Big\}$$

length 80

feasiblefactorlist[41, (x + 5) ^25 (x - 7) ^4]

$$\Big\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x)^7,\ (-9+x)^2\,(-7+x)^7\left(-932+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^6\left(80-19\,x+x^2\right),\ (-9+x)^2\,(-7+x)^7\left(-928+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^5\left(-556+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^2\,(-7+x)^6\left(6452-2975\,x+503\,x^2-37\,x^3+x^4\right),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^8,\ (-9+x)^4\,(-8+x)\,(-7+x)^5\left(69-18\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^6\left(-712+251\,x-28\,x^2+x^3\right),$$
$$(-9+x)^2\,(-8+x)\,(-7+x)^5\left(95-20\,x+x^2\right)\left(59-16\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^6\left(73-18\,x+x^2\right),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^8,\ (-9+x)^4\,(-7+x)^5\left(-548+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^5\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^3\,(-7+x)^5\left(73-18\,x+x^2\right)\left(68-17\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)^6\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-11+x)^2\,(-9+x)\,(-7+x)^7\left(68-17\,x+x^2\right),\ (-9+x)^4\,(-7+x)^5\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^5\left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^2\,(-7+x)^5\left(59-16\,x+x^2\right)\left(-752+255\,x-28\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^6\left(64-17\,x+x^2\right),\ (-12+x)\,(-9+x)^5\,(-7+x)^5\,(-5+x),$$
$$(-9+x)^4\,(-7+x)^4\left(73-18\,x+x^2\right)\left(52-15\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^5\left(4876-2457\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^6\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-8+x)\,(-7+x)^4\left(-467+195\,x-25\,x^2+x^3\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^3\,(-5+x)\left(73-18\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^5\left(-536+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^4\left(3768-2027\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^3\,(-8+x)\,(-7+x)^5\,(-5+x),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^4\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^4\left(-412+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^5\,(-7+x)^3\,(-5+x)\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^3\left(-26\,084+17\,885\,x-4788\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^5\left(-532+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^3\left(59-16\,x+x^2\right)\left(-444+183\,x-24\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^4\,(-5+x)\left(68-17\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^3\left(68-17\,x+x^2\right)\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^3\left(2864-1661\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)^4\left(3680-2019\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-9+x)^6\,(-7+x)^3\,(-5+x)\left(64-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^3\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$

$$(-9+x)^4\,(-7+x)^3\,\left(-25\,888+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^5\,\left(48-15\,x+x^2\right),\ (-9+x)^5\,(-7+x)^4\,\left(-404+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^3\,\left(-316+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^3\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^4\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^5\,(-7+x)^3\,(-5+x)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^3\,\left(59-16\,x+x^2\right)\,\left(-436+183\,x-24\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^2\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^3\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^3\,\left(-312+149\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-8+x)\,(-7+x)^4\,\left(41-14\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^6\,(-8+x)\,(-7+x)^2\,(-5+x)^2,$$
$$(-9+x)^5\,(-7+x)^3\,\left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)\,(-5+x)\,\left(59-16\,x+x^2\right)^2,\ (-11+x)\,(-9+x)^6\,(-7+x)^4\,(-4+x),$$
$$(-9+x)^6\,(-7+x)^2\,\left(2172-1351\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^5\,(-7+x)^3\,\left(68-17\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^7\,(-7+x)\,(-5+x)^2\,\left(68-17\,x+x^2\right),\ (-9+x)^6\,(-7+x)^3\,\left(-304+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^2\,\left(2144-1347\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\,(-7+x)^2\,(-5+x)\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)\,\left(59-16\,x+x^2\right)\,\left(-256+127\,x-20\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^3\,\left(-300+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^2\,\left(2116-1343\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\,(-7+x)\,(-5+x)\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^2\,\left(52-15\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^8\,(-5+x)^2\,\left(52-15\,x+x^2\right),\ (-9+x)^6\,(-8+x)\,(-7+x)^3\,\left(37-14\,x+x^2\right),$$
$$(-9+x)^6\,(-8+x)\,(-7+x)\,\left(59-16\,x+x^2\right)\,\left(31-12\,x+x^2\right),$$
$$(-9+x)^7\,(-7+x)^2\,\left(-232+123\,x-20\,x^2+x^3\right),$$
$$(-9+x)^7\,(-8+x)\,(-7+x)\,(-5+x)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)^3\,\left(-292+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^7\,(-7+x)\,\left(1604-1089\,x+263\,x^2-27\,x^3+x^4\right),\ (-9+x)^9\,(-7+x)\,(-5+x)\,(-4+x),$$
$$(-9+x)^7\,(-7+x)^3\,\left(32-13\,x+x^2\right),\ (-9+x)^8\,(-7+x)\,\left(-176+101\,x-18\,x^2+x^3\right),$$
$$(-9+x)^8\,(-7+x)\,\left(-172+101\,x-18\,x^2+x^3\right),\ (-9+x)^8\,(-8+x)\,(-7+x)^2\,(-3+x)\Big\}$$

length 81

feasiblefactorlist[41, (x + 5) ^ 25 (x - 7) ^ 3]

$$\Big\{(-13+x)\,(-9+x)^3\,(-8+x)\,(-7+x)^8,\ (-9+x)^2\,(-7+x)^8\,\left(-932+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^7\,\left(80-19\,x+x^2\right),\ (-9+x)^2\,(-7+x)^8\,\left(-928+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^6\,\left(-556+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^2\,(-7+x)^7\,\left(6452-2975\,x+503\,x^2-37\,x^3+x^4\right),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^9,\ (-9+x)^4\,(-8+x)\,(-7+x)^6\,\left(69-18\,x+x^2\right),$$

$$(-9+x)^3\,(-7+x)^7\,\left(-712+251\,x-28\,x^2+x^3\right),$$
$$(-9+x)^2\,(-8+x)\,(-7+x)^6\,\left(95-20\,x+x^2\right)\,\left(59-16\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^7\,\left(73-18\,x+x^2\right),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^9,\ (-9+x)^4\,(-7+x)^6\,\left(-548+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^6\,\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^3\,(-7+x)^6\,\left(73-18\,x+x^2\right)\,\left(68-17\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)^7\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-11+x)^2\,(-9+x)\,(-7+x)^8\,\left(68-17\,x+x^2\right),\ (-9+x)^4\,(-7+x)^6\,\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^6\,\left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^2\,(-7+x)^6\,\left(59-16\,x+x^2\right)\,\left(-752+255\,x-28\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^7\,\left(64-17\,x+x^2\right),\ (-12+x)\,(-9+x)^5\,(-7+x)^6\,(-5+x),$$
$$(-9+x)^4\,(-7+x)^5\,\left(73-18\,x+x^2\right)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^6\,\left(4876-2457\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^7\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-8+x)\,(-7+x)^5\,\left(-467+195\,x-25\,x^2+x^3\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^4\,(-5+x)\,\left(73-18\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^6\,\left(-536+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^5\,\left(3768-2027\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^3\,(-8+x)\,(-7+x)^6\,(-5+x),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^5\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^5\,\left(-412+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^5\,(-7+x)^4\,(-5+x)\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(-26\,084+17\,885\,x-4788\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^6\,\left(-532+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(59-16\,x+x^2\right)\,\left(-444+183\,x-24\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^5\,(-5+x)\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^4\,\left(68-17\,x+x^2\right)\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^4\,\left(2864-1661\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)^5\,\left(3680-2019\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-9+x)^6\,(-7+x)^4\,(-5+x)\,\left(64-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(-25\,888+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^6\,\left(48-15\,x+x^2\right),\ (-9+x)^5\,(-7+x)^5\,\left(-404+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^4\,\left(-316+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^5\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^5\,(-7+x)^4\,(-5+x)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^4\,\left(59-16\,x+x^2\right)\,\left(-436+183\,x-24\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^3\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^4\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^4\,\left(-312+149\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-8+x)\,(-7+x)^5\,\left(41-14\,x+x^2\right),$$

$$(-11+x)\ (-9+x)^6\ (-8+x)\ (-7+x)^3\ (-5+x)^2,$$
$$(-9+x)^5\ (-7+x)^4\ \left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^5\ (-8+x)\ (-7+x)^2\ (-5+x)\ \left(59-16\,x+x^2\right)^2,\ (-11+x)\ (-9+x)^6\ (-7+x)^5\ (-4+x),$$
$$(-9+x)^6\ (-7+x)^3\ \left(2172-1351\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^5\ (-7+x)^4\ \left(68-17\,x+x^2\right)\ \left(41-14\,x+x^2\right),$$
$$(-9+x)^7\ (-7+x)^2\ (-5+x)^2\ \left(68-17\,x+x^2\right),\ (-9+x)^6\ (-7+x)^4\ \left(-304+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\ (-7+x)^3\ \left(2144-1347\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\ (-7+x)^3\ (-5+x)\ \left(48-15\,x+x^2\right),$$
$$(-9+x)^6\ (-7+x)^2\ \left(59-16\,x+x^2\right)\ \left(-256+127\,x-20\,x^2+x^3\right),$$
$$(-9+x)^6\ (-7+x)^4\ \left(-300+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\ (-7+x)^3\ \left(2116-1343\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\ (-7+x)^2\ (-5+x)\ \left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\ (-7+x)^3\ \left(52-15\,x+x^2\right)\ \left(41-14\,x+x^2\right),$$
$$(-9+x)^8\ (-7+x)\ (-5+x)^2\ \left(52-15\,x+x^2\right),\ (-9+x)^6\ (-8+x)\ (-7+x)^4\ \left(37-14\,x+x^2\right),$$
$$(-9+x)^6\ (-8+x)\ (-7+x)^2\ \left(59-16\,x+x^2\right)\ \left(31-12\,x+x^2\right),$$
$$(-9+x)^7\ (-7+x)^3\ \left(-232+123\,x-20\,x^2+x^3\right),$$
$$(-9+x)^7\ (-8+x)\ (-7+x)^2\ (-5+x)\ \left(41-14\,x+x^2\right),$$
$$(-9+x)^9\ (-8+x)\ (-5+x)^3,\ (-9+x)^6\ (-7+x)^4\ \left(-292+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^7\ (-7+x)^2\ \left(1604-1089\,x+263\,x^2-27\,x^3+x^4\right),$$
$$(-9+x)^9\ (-7+x)^2\ (-5+x)\ (-4+x),\ (-9+x)^7\ (-7+x)^4\ \left(32-13\,x+x^2\right),$$
$$(-9+x)^8\ (-7+x)^2\ \left(-176+101\,x-18\,x^2+x^3\right),$$
$$(-9+x)^8\ (-7+x)^2\ \left(-172+101\,x-18\,x^2+x^3\right),\ (-9+x)^8\ (-8+x)\ (-7+x)^3\ (-3+x)\Big\}$$

$$\texttt{list} = \Big\{(-13+x)\ (-9+x)^3\ (-8+x)\ (-7+x)^{11}\ (5+x)^{25},$$
$$(-9+x)^2\ (-7+x)^{11}\ (5+x)^{25}\ \left(-932+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^4\ (-7+x)^{10}\ (5+x)^{25}\ \left(80-19\,x+x^2\right),\ (-9+x)^2\ (-7+x)^{11}\ (5+x)^{25}$$
$$\left(-928+293\,x-30\,x^2+x^3\right),\ (-9+x)^4\ (-7+x)^9\ (5+x)^{25}\ \left(-556+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^2\ (-7+x)^{10}\ (5+x)^{25}\ \left(6452-2975\,x+503\,x^2-37\,x^3+x^4\right),$$
$$(-12+x)\ (-11+x)\ (-9+x)^2\ (-7+x)^{12}\ (5+x)^{25},$$
$$(-9+x)^4\ (-8+x)\ (-7+x)^9\ (5+x)^{25}\ \left(69-18\,x+x^2\right),$$
$$(-9+x)^3\ (-7+x)^{10}\ (5+x)^{25}\ \left(-712+251\,x-28\,x^2+x^3\right),$$
$$(-9+x)^2\ (-8+x)\ (-7+x)^9\ (5+x)^{25}\ \left(95-20\,x+x^2\right)\ \left(59-16\,x+x^2\right),$$
$$(-11+x)\ (-9+x)^2\ (-8+x)\ (-7+x)^{10}\ (5+x)^{25}\ \left(73-18\,x+x^2\right),$$
$$(-11+x)^3\ (-8+x)\ (-7+x)^{12}\ (5+x)^{25},$$
$$(-9+x)^4\ (-7+x)^9\ (5+x)^{25}\ \left(-548+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\ (-7+x)^9\ (5+x)^{25}\ \left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^3\ (-7+x)^9\ (5+x)^{25}\ \left(73-18\,x+x^2\right)\ \left(68-17\,x+x^2\right),$$
$$(-11+x)\ (-9+x)^2\ (-7+x)^{10}\ (5+x)^{25}\ \left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-11+x)^2\ (-9+x)\ (-7+x)^{11}\ (5+x)^{25}\ \left(68-17\,x+x^2\right),$$
$$(-9+x)^4\ (-7+x)^9\ (5+x)^{25}\ \left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\ (-7+x)^9\ (5+x)^{25}\ \left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^2\ (-7+x)^9\ (5+x)^{25}\ \left(59-16\,x+x^2\right)\ \left(-752+255\,x-28\,x^2+x^3\right),$$

$$(-11+x)\,(-9+x)^3\,(-7+x)^{10}\,(5+x)^{25}\,\left(64-17\,x+x^2\right),$$
$$(-12+x)\,(-9+x)^5\,(-7+x)^9\,(-5+x)\,(5+x)^{25},$$
$$(-9+x)^4\,(-7+x)^8\,(5+x)^{25}\,\left(73-18\,x+x^2\right)\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^9\,(5+x)^{25}\,\left(4876-2457\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^{10}\,(5+x)^{25}\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-8+x)\,(-7+x)^8\,(5+x)^{25}\,\left(-467+195\,x-25\,x^2+x^3\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^7\,(-5+x)\,(5+x)^{25}\,\left(73-18\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(-536+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^8\,(5+x)^{25}\,\left(3768-2027\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-11+x)^2\,(-9+x)^3\,(-8+x)\,(-7+x)^9\,(-5+x)\,(5+x)^{25},$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^8\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^8\,(5+x)^{25}\,\left(-412+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^5\,(-7+x)^7\,(-5+x)\,(5+x)^{25}\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-26\,084+17\,885\,x-4788\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(-532+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(59-16\,x+x^2\right)\,\left(-444+183\,x-24\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^8\,(-5+x)\,(5+x)^{25}\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^3\,(-7+x)^7\,(5+x)^{25}\,\left(68-17\,x+x^2\right)\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^7\,(5+x)^{25}\,\left(2864-1661\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)^8\,(5+x)^{25}\,\left(3680-2019\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-9+x)^6\,(-7+x)^7\,(-5+x)\,(5+x)^{25}\,\left(64-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-25\,888+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^5\,(-7+x)^8\,(5+x)^{25}\,\left(-404+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-316+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^8\,(5+x)^{25}\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^5\,(-7+x)^7\,(-5+x)\,(5+x)^{25}\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(59-16\,x+x^2\right)\,\left(-436+183\,x-24\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^6\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^7\,(5+x)^{25}\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-312+149\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-8+x)\,(-7+x)^8\,(5+x)^{25}\,\left(41-14\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^6\,(-8+x)\,(-7+x)^6\,(-5+x)^2\,(5+x)^{25},$$
$$(-9+x)^5\,(-7+x)^7\,(5+x)^{25}\,\left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^5\,(-5+x)\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2,$$
$$(-11+x)\,(-9+x)^6\,(-7+x)^8\,(-4+x)\,(5+x)^{25},$$
$$(-9+x)^6\,(-7+x)^6\,(5+x)^{25}\,\left(2172-1351\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^5\,(-7+x)^7\,(5+x)^{25}\,\left(68-17\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^7\,(-7+x)^5\,(-5+x)^2\,(5+x)^{25}\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-304+149\,x-22\,x^2+x^3\right),$$

$$(-9+x)^6\,(-7+x)^6\,(5+x)^{25}\,\left(2144-1347\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\,(-7+x)^6\,(-5+x)\,(5+x)^{25}\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)^5\,(5+x)^{25}\,\left(59-16\,x+x^2\right)\,\left(-256+127\,x-20\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-300+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^6\,(5+x)^{25}\,\left(2116-1343\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^7\,(-7+x)^5\,(-5+x)\,(5+x)^{25}\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^6\,(5+x)^{25}\,\left(52-15\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^8\,(-7+x)^4\,(-5+x)^2\,(5+x)^{25}\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^6\,(-8+x)\,(-7+x)^7\,(5+x)^{25}\,\left(37-14\,x+x^2\right),$$
$$(-9+x)^6\,(-8+x)\,(-7+x)^5\,(5+x)^{25}\,\left(59-16\,x+x^2\right)\,\left(31-12\,x+x^2\right),$$
$$(-9+x)^7\,(-7+x)^6\,(5+x)^{25}\,\left(-232+123\,x-20\,x^2+x^3\right),$$
$$(-9+x)^7\,(-8+x)\,(-7+x)^5\,(-5+x)\,(5+x)^{25}\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^9\,(-8+x)\,(-7+x)^3\,(-5+x)^3\,(5+x)^{25},$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-292+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^7\,(-7+x)^5\,(5+x)^{25}\,\left(1604-1089\,x+263\,x^2-27\,x^3+x^4\right),$$
$$(-9+x)^9\,(-7+x)^5\,(-5+x)\,(-4+x)\,(5+x)^{25},\ (-9+x)^7\,(-7+x)^7\,(5+x)^{25}$$
$$\left(32-13\,x+x^2\right),\ (-9+x)^8\,(-7+x)^5\,(5+x)^{25}\,\left(-176+101\,x-18\,x^2+x^3\right),$$
$$(-9+x)^8\,(-7+x)^5\,(5+x)^{25}\,\left(-172+101\,x-18\,x^2+x^3\right),$$
$$(-9+x)^8\,(-8+x)\,(-7+x)^6\,(-3+x)\,(5+x)^{25}\Big\};$$

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Length[list]
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82

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listmod64 = modfilter[list, Smod64n41unrefined, 64]
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$$\Big\{(-9+x)^4\,(-7+x)^{10}\,(5+x)^{25}\,\left(80-19\,x+x^2\right),$$
$$(-9+x)^2\,(-7+x)^{11}\,(5+x)^{25}\,\left(-928+293\,x-30\,x^2+x^3\right),$$
$$(-9+x)^2\,(-7+x)^{10}\,(5+x)^{25}\,\left(6452-2975\,x+503\,x^2-37\,x^3+x^4\right),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^{12}\,(5+x)^{25},$$
$$(-9+x)^2\,(-8+x)\,(-7+x)^9\,(5+x)^{25}\,\left(95-20\,x+x^2\right)\,\left(59-16\,x+x^2\right),$$
$$(-11+x)^3\,(-8+x)\,(-7+x)^{12}\,(5+x)^{25},$$
$$(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(-548+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^9\,(5+x)^{25}\,\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^3\,(-7+x)^9\,(5+x)^{25}\,\left(73-18\,x+x^2\right)\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-9+x)^3\,(-7+x)^9\,(5+x)^{25}\,\left(4912-2461\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^{10}\,(5+x)^{25}\,\left(64-17\,x+x^2\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^{10}\,(5+x)^{25}\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^7\,(-5+x)\,(5+x)^{25}\,\left(73-18\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^8\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^8\,(5+x)^{25}\,\left(-412+179\,x-24\,x^2+x^3\right),$$
$$(-9+x)^5\,(-7+x)^7\,(-5+x)\,(5+x)^{25}\,\left(-580+217\,x-26\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(-532+213\,x-26\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^8\,(-5+x)\,(5+x)^{25}\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^8\,(5+x)^{25}\,\left(3680-2019\,x+395\,x^2-33\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(59-16\,x+x^2\right)\,\left(-436+183\,x-24\,x^2+x^3\right),$$
$$(-9+x)^4\,(-7+x)^6\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^7\,(5+x)^{25}\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-312+149\,x-22\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^6\,(-8+x)\,(-7+x)^6\,(-5+x)^2\,(5+x)^{25},$$
$$(-9+x)^5\,(-7+x)^7\,(5+x)^{25}\,\left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-11+x)\,(-9+x)^6\,(-7+x)^8\,(-4+x)\,(5+x)^{25},$$
$$(-9+x)^6\,(-7+x)^6\,(5+x)^{25}\,\left(2172-1351\,x+303\,x^2-29\,x^3+x^4\right),$$
$$(-9+x)^5\,(-7+x)^7\,(5+x)^{25}\,\left(68-17\,x+x^2\right)\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)^5\,(5+x)^{25}\,\left(59-16\,x+x^2\right)\,\left(-256+127\,x-20\,x^2+x^3\right),$$
$$(-9+x)^7\,(-7+x)^5\,(-5+x)\,(5+x)^{25}\,\left(-332+153\,x-22\,x^2+x^3\right),$$
$$(-9+x)^8\,(-7+x)^4\,(-5+x)^2\,(5+x)^{25}\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^6\,(-8+x)\,(-7+x)^7\,(5+x)^{25}\,\left(37-14\,x+x^2\right),$$
$$(-9+x)^7\,(-7+x)^6\,(5+x)^{25}\,\left(-232+123\,x-20\,x^2+x^3\right),$$
$$(-9+x)^7\,(-8+x)\,(-7+x)^5\,(-5+x)\,(5+x)^{25}\,\left(41-14\,x+x^2\right),$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-292+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^8\,(-7+x)^5\,(5+x)^{25}\,\left(-172+101\,x-18\,x^2+x^3\right),$$
$$(-9+x)^8\,(-8+x)\,(-7+x)^6\,(-3+x)\,(5+x)^{25}\Big\}$$

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Length[listmod64]
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41

```
listmod128 = modfilter[listmod64, Smod128n41unrefined, 128]
```

$$\Big\{(-9+x)^4\,(-7+x)^{10}\,(5+x)^{25}\,\left(80-19\,x+x^2\right),$$
$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^{12}\,(5+x)^{25},\ (-11+x)^3\,(-8+x)\,(-7+x)^{12}\,(5+x)^{25},$$
$$(-9+x)^3\,(-7+x)^9\,(5+x)^{25}\,\left(4948-2465\,x+447\,x^2-35\,x^3+x^4\right),$$
$$(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(-544+213\,x-26\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^3\,(-7+x)^{10}\,(5+x)^{25}\,\left(64-17\,x+x^2\right),$$
$$(-11+x)^2\,(-9+x)^2\,(-7+x)^{10}\,(5+x)^{25}\,\left(52-15\,x+x^2\right),$$
$$(-11+x)\,(-9+x)^2\,(-8+x)\,(-7+x)^8\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2,$$
$$(-9+x)^5\,(-7+x)^8\,(5+x)^{25}\,\left(-412+179\,x-24\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^8\,(-5+x)\,(5+x)^{25}\,\left(68-17\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(48-15\,x+x^2\right),$$
$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\,\left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right),$$
$$(-9+x)^4\,(-7+x)^6\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^5\,(-8+x)\,(-7+x)^7\,(5+x)^{25}\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^6\,(-8+x)\,(-7+x)^6\,(-5+x)^2\,(5+x)^{25},$$
$$(-9+x)^5\,(-7+x)^7\,(5+x)^{25}\,\left(2824-1653\,x+347\,x^2-31\,x^3+x^4\right),$$
$$(-11+x)\,(-9+x)^6\,(-7+x)^8\,(-4+x)\,(5+x)^{25},$$
$$(-9+x)^8\,(-7+x)^4\,(-5+x)^2\,(5+x)^{25}\,\left(52-15\,x+x^2\right),$$
$$(-9+x)^7\,(-7+x)^6\,(5+x)^{25}\,\left(-232+123\,x-20\,x^2+x^3\right),$$
$$(-9+x)^6\,(-7+x)^7\,(5+x)^{25}\,\left(-292+149\,x-22\,x^2+x^3\right),$$
$$(-9+x)^8\,(-8+x)\,(-7+x)^6\,(-3+x)\,(5+x)^{25}\Big\}$$

```
listmod128 = {(-9 + x)^4 (-7 + x)^10 (5 + x)^25 (80 - 19 x + x^2),
    (-12 + x) (-11 + x) (-9 + x)^2 (-7 + x)^12 (5 + x)^25, (-11 + x)^3 (-8 + x) (-7 + x)^12 (5 + x)^25,
    (-9 + x)^3 (-7 + x)^9 (5 + x)^25 (4948 - 2465 x + 447 x^2 - 35 x^3 + x^4),
    (-9 + x)^4 (-7 + x)^9 (5 + x)^25 (-544 + 213 x - 26 x^2 + x^3),
    (-11 + x) (-9 + x)^3 (-7 + x)^10 (5 + x)^25 (64 - 17 x + x^2),
    (-11 + x)^2 (-9 + x)^2 (-7 + x)^10 (5 + x)^25 (52 - 15 x + x^2),
    (-11 + x) (-9 + x)^2 (-8 + x) (-7 + x)^8 (5 + x)^25 (59 - 16 x + x^2)^2,
    (-9 + x)^5 (-7 + x)^8 (5 + x)^25 (-412 + 179 x - 24 x^2 + x^3),
    (-11 + x) (-9 + x)^4 (-7 + x)^8 (-5 + x) (5 + x)^25 (68 - 17 x + x^2),
    (-9 + x)^4 (-7 + x)^7 (5 + x)^25 (-25 904 + 17 829 x - 4784 x^2 + 626 x^3 - 40 x^4 + x^5),
    (-11 + x) (-9 + x)^4 (-7 + x)^9 (5 + x)^25 (48 - 15 x + x^2),
    (-9 + x)^4 (-7 + x)^7 (5 + x)^25 (-25 580 + 17 757 x - 4780 x^2 + 626 x^3 - 40 x^4 + x^5),
    (-9 + x)^4 (-7 + x)^6 (5 + x)^25 (59 - 16 x + x^2)^2 (52 - 15 x + x^2),
    (-9 + x)^5 (-8 + x) (-7 + x)^7 (5 + x)^25 (-349 + 163 x - 23 x^2 + x^3),
    (-11 + x) (-9 + x)^6 (-8 + x) (-7 + x)^6 (-5 + x)^2 (5 + x)^25,
    (-9 + x)^5 (-7 + x)^7 (5 + x)^25 (2824 - 1653 x + 347 x^2 - 31 x^3 + x^4),
    (-11 + x) (-9 + x)^6 (-7 + x)^8 (-4 + x) (5 + x)^25,
    (-9 + x)^8 (-7 + x)^4 (-5 + x)^2 (5 + x)^25 (52 - 15 x + x^2),
    (-9 + x)^7 (-7 + x)^6 (5 + x)^25 (-232 + 123 x - 20 x^2 + x^3),
    (-9 + x)^6 (-7 + x)^7 (5 + x)^25 (-292 + 149 x - 22 x^2 + x^3),
    (-9 + x)^8 (-8 + x) (-7 + x)^6 (-3 + x) (5 + x)^25};

Length[listmod128]
22
```

```
poly1 = listmod128[[1]]
(-9 + x)^4 (-7 + x)^10 (5 + x)^25 (80 - 19 x + x^2)

p1 = poly1 / minipoly[poly1] // Factor
(-9 + x)^3 (-7 + x)^9 (5 + x)^24

feasiblesubcharpolylist[(-9 + x)^4 (-7 + x)^10 (5 + x)^25 (80 - 19 x + x^2)]
{1815 - 1314 x + 312 x^2 - 30 x^3 + x^4,
 (-7 + x) (-249 + 151 x - 23 x^2 + x^3), 1759 - 1306 x + 312 x^2 - 30 x^3 + x^4,
 (-7 + x) (-241 + 151 x - 23 x^2 + x^3), 1703 - 1298 x + 312 x^2 - 30 x^3 + x^4,
 (-9 + x) (-191 + 123 x - 21 x^2 + x^3), (-7 + x) (-233 + 151 x - 23 x^2 + x^3),
 (-9 + x) (-183 + 123 x - 21 x^2 + x^3), (-9 + x) (-7 + x) (25 - 14 x + x^2)}
```

```
CoefficientList[{1815 - 1314 x + 312 x^2 - 30 x^3 + x^4,
   (-7 + x) (-249 + 151 x - 23 x^2 + x^3), 1759 - 1306 x + 312 x^2 - 30 x^3 + x^4,
   (-7 + x) (-241 + 151 x - 23 x^2 + x^3), 1703 - 1298 x + 312 x^2 - 30 x^3 + x^4,
   (-9 + x) (-191 + 123 x - 21 x^2 + x^3), (-7 + x) (-233 + 151 x - 23 x^2 + x^3),
   (-9 + x) (-183 + 123 x - 21 x^2 + x^3), (-9 + x) (-7 + x) (25 - 14 x + x^2)}, x]
```

```
{{1815, -1314, 312, -30, 1}, {1743, -1306, 312, -30, 1}, {1759, -1306, 312, -30, 1},
 {1687, -1298, 312, -30, 1}, {1703, -1298, 312, -30, 1}, {1719, -1298, 312, -30, 1},
 {1631, -1290, 312, -30, 1}, {1647, -1290, 312, -30, 1}, {1575, -1282, 312, -30, 1}}
```

```
A = {{1815, -1314, 312, -30, 1}, {1743, -1306, 312, -30, 1},
    {1759, -1306, 312, -30, 1}, {1687, -1298, 312, -30, 1},
    {1703, -1298, 312, -30, 1}, {1719, -1298, 312, -30, 1}, {1631, -1290,
     312, -30, 1}, {1647, -1290, 312, -30, 1}, {1575, -1282, 312, -30, 1}};
```

```
MatrixRank[A]
```

```
3
```

```
CoefficientList[D[poly1, x] / p1 // Factor, x]
```

```
{72 815, -53 602, 12 792, -1230, 41}
```

```
Solve[
 Array[n, 9].{{1815, -1314, 312, -30, 1}, {1743, -1306, 312, -30, 1}, {1759, -1306,
     312, -30, 1}, {1687, -1298, 312, -30, 1}, {1703, -1298, 312, -30, 1},
    {1719, -1298, 312, -30, 1}, {1631, -1290, 312, -30, 1},
    {1647, -1290, 312, -30, 1}, {1575, -1282, 312, -30, 1}} ==
  {72 815, -53 602, 12 792, -1230, 41}, Array[n, 9]]
```

```
Solve::svars : Equations may not give solutions for all "solve" variables.  >>
```

```
{{n[7] → 70 - 3 n[1] - 3 n[2] - 2 n[3] - 2 n[4] - n[5],
  n[8] → 60 - n[1] - n[3] - n[5] - 2 n[6],
  n[9] → -89 + 3 n[1] + 2 n[2] + 2 n[3] + n[4] + n[5] + n[6]}}
```

```
FindInstance[-n[7] + 70 - 3 n[1] - 3 n[2] - 2 n[3] - 2 n[4] - n[5] == 0 &&
  -n[8] + 60 - n[1] - n[3] - n[5] - 2 n[6] == 0 &&
  -n[9] - 89 + 3 n[1] + 2 n[2] + 2 n[3] + n[4] + n[5] + n[6] == 0 &&
  n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 &&
  n[7] ≥ 0 && n[8] ≥ 0 && n[9] ≥ 0, Array[n, 9], Integers]
```

```
{}
```

```
CoefficientList[{1815 - 1314 x + 312 x^2 - 30 x^3 + x^4,
    (-7 + x) (-249 + 151 x - 23 x^2 + x^3), 1759 - 1306 x + 312 x^2 - 30 x^3 + x^4,
    (-7 + x) (-241 + 151 x - 23 x^2 + x^3), 1703 - 1298 x + 312 x^2 - 30 x^3 + x^4,
    (-9 + x) (-191 + 123 x - 21 x^2 + x^3), (-7 + x) (-233 + 151 x - 23 x^2 + x^3),
    (-9 + x) (-183 + 123 x - 21 x^2 + x^3), (-9 + x) (-7 + x) (25 - 14 x + x^2)}, x] // MatrixForm
```

$$\begin{pmatrix} 1815 & -1314 & 312 & -30 & 1 \\ 1743 & -1306 & 312 & -30 & 1 \\ 1759 & -1306 & 312 & -30 & 1 \\ 1687 & -1298 & 312 & -30 & 1 \\ 1703 & -1298 & 312 & -30 & 1 \\ 1719 & -1298 & 312 & -30 & 1 \\ 1631 & -1290 & 312 & -30 & 1 \\ 1647 & -1290 & 312 & -30 & 1 \\ 1575 & -1282 & 312 & -30 & 1 \end{pmatrix}$$

```
CoefficientList[D[poly1, x] / p1 // Factor, x]
```

$$\{72\,815, -53\,602, 12\,792, -1230, 41\}$$

```
Transpose[{{1815, -1314, 312, -30, 1}, {1743, -1306, 312, -30, 1},
  {1759, -1306, 312, -30, 1}, {1687, -1298, 312, -30, 1}, {1703, -1298, 312, -30, 1},
  {1719, -1298, 312, -30, 1}, {1631, -1290, 312, -30, 1}, {1647, -1290, 312, -30, 1},
  {1575, -1282, 312, -30, 1}}] // MatrixForm
```

$$\begin{pmatrix} 1815 & 1743 & 1759 & 1687 & 1703 & 1719 & 1631 & 1647 & 1575 \\ -1314 & -1306 & -1306 & -1298 & -1298 & -1298 & -1290 & -1290 & -1282 \\ 312 & 312 & 312 & 312 & 312 & 312 & 312 & 312 & 312 \\ -30 & -30 & -30 & -30 & -30 & -30 & -30 & -30 & -30 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

```
Array[m, 5].{{1815, 1743, 1759, 1687, 1703, 1719, 1631, 1647, 1575},
  {-1314, -1306, -1306, -1298, -1298, -1298, -1290, -1290, -1282},
  {312, 312, 312, 312, 312, 312, 312, 312, 312},
  {-30, -30, -30, -30, -30, -30, -30, -30, -30}, {1, 1, 1, 1, 1, 1, 1, 1, 1}}
```

$$\begin{pmatrix} 1815 & 1743 & 1759 & 1687 & 1703 & 1719 & 1631 & 1647 & 1575 \\ -1314 & -1306 & -1306 & -1298 & -1298 & -1298 & -1290 & -1290 & -1282 \\ 312 & 312 & 312 & 312 & 312 & 312 & 312 & 312 & 312 \\ -30 & -30 & -30 & -30 & -30 & -30 & -30 & -30 & -30 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

$$\{1815\,m[1] - 1314\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1743\,m[1] - 1306\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1759\,m[1] - 1306\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1687\,m[1] - 1298\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1703\,m[1] - 1298\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1719\,m[1] - 1298\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1631\,m[1] - 1290\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1647\,m[1] - 1290\,m[2] + 312\,m[3] - 30\,m[4] + m[5],$$
$$1575\,m[1] - 1282\,m[2] + 312\,m[3] - 30\,m[4] + m[5]\}$$

```
Array[m, 5].{72 815, -53 602, 12 792, -1230, 41}
```

$$72\,815\,m[1] - 53\,602\,m[2] + 12\,792\,m[3] - 1230\,m[4] + 41\,m[5]$$

```
FindInstance[1815 m[1] - 1314 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1743 m[1] - 1306 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1759 m[1] - 1306 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1687 m[1] - 1298 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1703 m[1] - 1298 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1719 m[1] - 1298 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1631 m[1] - 1290 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1647 m[1] - 1290 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  1575 m[1] - 1282 m[2] + 312 m[3] - 30 m[4] + m[5] ≥ 0 &&
  72 815 m[1] - 53 602 m[2] + 12 792 m[3] - 1230 m[4] + 41 m[5] < 0, Array[m, 5], Integers]
```

```
{{m[1] → -4390, m[2] → -26 341, m[3] → 0, m[4] → 0, m[5] → -26 642 928}}
```

```
Array[m, 5] /. {m[1] → -4390, m[2] → -26 341, m[3] → 0, m[4] → 0, m[5] → -26 642 928}
```

```
{-4390, -26 341, 0, 0, -26 642 928}
```

```
GCD[-4390, -26 341, 0, 0, -26 642 928]
```

```
1
```

```
{-4390, -26 341, 0, 0, -26 642 928}.
```

$$\begin{pmatrix} 1815 & 1743 & 1759 & 1687 & 1703 & 1719 & 1631 & 1647 & 1575 \\ -1314 & -1306 & -1306 & -1298 & -1298 & -1298 & -1290 & -1290 & -1282 \\ 312 & 312 & 312 & 312 & 312 & 312 & 312 & 312 & 312 \\ -30 & -30 & -30 & -30 & -30 & -30 & -30 & -30 & -30 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

```
{1296, 106 648, 36 408, 141 760, 71 520, 1280, 176 872, 106 632, 211 984}
```

```
{-4390, -26 341, 0, 0, -26 642 928}.{72 815, -53 602, 12 792, -1230, 41}
```

```
-87 616
```

```
poly2 = listmod128[[2]]
```

$$(-12+x)\,(-11+x)\,(-9+x)^2\,(-7+x)^{12}\,(5+x)^{25}$$

```
p2 = poly2 / minipoly[poly2] // Factor
```

$$(-9+x)\,(-7+x)^{11}\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-12 + x) (-11 + x) (-9 + x)^2 (-7 + x)^12 (5 + x)^25]
```

$$\left\{(-11+x)\left(-269+155\,x-23\,x^2+x^3\right),\ (-11+x)\,(-9+x)\left(29-14\,x+x^2\right)\right\}$$

```
CoefficientList[
 {(-11 + x) (-269 + 155 x - 23 x^2 + x^3), (-11 + x) (-9 + x) (29 - 14 x + x^2)}, x]
```

```
{{2959, -1974, 408, -34, 1}, {2871, -1966, 408, -34, 1}}
```

```
CoefficientList[D[poly2, x] / p2 // Factor, x]
```

```
{120 135, -80 838, 16 728, -1394, 41}
```

```
Solve[Array[n, 2].{{2959, -1974, 408, -34, 1}, {2871, -1966, 408, -34, 1}} ==
  {120 135, -80 838, 16 728, -1394, 41}, Array[n, 2]]
```

```
{}
```

```
A = {{2959, -1974, 408, -34, 1}, {2871, -1966, 408, -34, 1}}
```

```
{{2959, -1974, 408, -34, 1}, {2871, -1966, 408, -34, 1}}
```

```
Array[m, 5].Transpose[A]
```

```
{2959 m[1] - 1974 m[2] + 408 m[3] - 34 m[4] + m[5],
 2871 m[1] - 1966 m[2] + 408 m[3] - 34 m[4] + m[5]}
```

```
Array[m, 5].{120 135, -80 838, 16 728, -1394, 41}
```

```
120 135 m[1] - 80 838 m[2] + 16 728 m[3] - 1394 m[4] + 41 m[5]
```

```
Array[m, 5] /. FindInstance[2959 m[1] - 1974 m[2] + 408 m[3] - 34 m[4] + m[5] ≥ 0 &&
    2871 m[1] - 1966 m[2] + 408 m[3] - 34 m[4] + m[5] ≥ 0 &&
    120 135 m[1] - 80 838 m[2] + 16 728 m[3] - 1394 m[4] + 41 m[5] < 0,
  Array[m, 5], Integers]
```

```
{{1713, 18 832, 0, 0, 32 108 784}}
```

```
1713 * 2959 + 18 832 * (-1974) + 32 108 784
```

```
3183
```

```
GCD[1713, 18 832, 0, 0, 32 108 784]
```

```
1
```

```
{1713, 18 832, 0, 0, 32 108 784}.Transpose[A]
```

```
{3183, 3095}
```

```
{1713, 18 832, 0, 0, 32 108 784}.{120 135, -80 838, 16 728, -1394, 41}
```

```
-89 817
```

```
poly3 = listmod128[[3]]
```

$$(-11+x)^3\ (-8+x)\ (-7+x)^{12}\ (5+x)^{25}$$

```
p3 = poly3 / minipoly[poly3] // Factor
```

$$(-11+x)^2\ (-7+x)^{11}\ (5+x)^{24}$$

```
feasiblesubcharpolylist[(-11 + x)^3 (-8 + x) (-7 + x)^12 (5 + x)^25]
```

$$\left\{-223+131\,x-21\,x^2+x^3,\ (-11+x)\ (-7+x)\ (-3+x)\right\}$$

```
CoefficientList[{-223 + 131 x - 21 x^2 + x^3, (-11 + x) (-7 + x) (-3 + x)}, x]
```

```
{{-223, 131, -21, 1}, {-231, 131, -21, 1}}
```

```
{{-231, 131, -21, 1}, {-223, 131, -21, 1}} // MatrixForm
```

$$\begin{pmatrix} -231 & 131 & -21 & 1 \\ -223 & 131 & -21 & 1 \end{pmatrix}$$

```
CoefficientList[D[poly3, x] / p3 // Factor, x]
```

$$\{-8895, 5371, -861, 41\}$$

```
Solve[Array[n, 2].{{-223, 131, -21, 1}, {-231, 131, -21, 1}} ==
  {-8895, 5371, -861, 41}, Array[n, 2]]
```

$$\{\{n[1] \to 72, n[2] \to -31\}\}$$

```
Array[m, 4].Transpose[{{-231, 131, -21, 1}, {-223, 131, -21, 1}}]
```

$$\{-231\, m[1] + 131\, m[2] - 21\, m[3] + m[4], -223\, m[1] + 131\, m[2] - 21\, m[3] + m[4]\}$$

```
Array[m, 4].{-8895, 5371, -861, 41}
```

$$-8895\, m[1] + 5371\, m[2] - 861\, m[3] + 41\, m[4]$$

```
FindInstance[
 -231 m[1] + 131 m[2] - 21 m[3] + m[4] ≥ 0 && -223 m[1] + 131 m[2] - 21 m[3] + m[4] ≥ 0 &&
  -8895 m[1] + 5371 m[2] - 861 m[3] + 41 m[4] < 0, Array[m, 4], Integers]
```

$$\{\{m[1] \to -62, m[2] \to 0, m[3] \to 0, m[4] \to -13\,493\}\}$$

```
Array[m, 4] /. {m[1] → -62, m[2] → 0, m[3] → 0, m[4] → -13 493}
```

$$\{-62, 0, 0, -13\,493\}$$

```
GCD[-62, 0, 0, -13 493]
```

$$1$$

```
{-62, 0, 0, -13 493} // Reverse
```

$$\{-13\,493, 0, 0, -62\}$$

```
{-62, 0, 0, -13 493}.{-8895, 5371, -861, 41}
```

$$-1723$$

```
{-62, 0, 0, -13 493}.Transpose[{{-231, 131, -21, 1}, {-223, 131, -21, 1}}]
```

$$\{829, 333\}$$

```
poly4 = listmod128[[4]]
```

$$(-9 + x)^3\, (-7 + x)^9\, (5 + x)^{25}\, \left(4948 - 2465\, x + 447\, x^2 - 35\, x^3 + x^4\right)$$

```
p4 = poly4 / minipoly[poly4] // Factor
```

$$(-9 + x)^2\, (-7 + x)^8\, (5 + x)^{24}$$

```
feasiblesubcharpolylist[(-9+x)^3 (-7+x)^9 (5+x)^25 (4948-2465 x+447 x^2-35 x^3+x^4)]
```

```
{(-9+x) (-7+x) (1735-1298 x+312 x^2-30 x^3+x^4),
 (-7+x) (-15583+13417 x-4106 x^2+582 x^3-39 x^4+x^5),
 (-9+x) (-7+x) (1751-1298 x+312 x^2-30 x^3+x^4),
 (-9+x) (-7+x) (1767-1298 x+312 x^2-30 x^3+x^4),
 (-9+x)^2 (-7+x) (-183+123 x-21 x^2+x^3), (-7+x)^2 (2113-1592 x+358 x^2-32 x^3+x^4),
 (-9+x) (-7+x) (1663-1290 x+312 x^2-30 x^3+x^4),
 (-9+x) (-7+x) (73-18 x+x^2) (23-12 x+x^2),
 (-9+x) (-7+x) (1695-1290 x+312 x^2-30 x^3+x^4),
 (-9+x)^2 (-7+x)^2 (25-14 x+x^2), (-9+x) (-7+x) (1591-1282 x+312 x^2-30 x^3+x^4),
 (-9+x) (-7+x) (1607-1282 x+312 x^2-30 x^3+x^4),
 (-9+x)^2 (-7+x) (-167+123 x-21 x^2+x^3), (-9+x) (-7+x)^2 (-217+151 x-23 x^2+x^3),
 (-9+x) (-7+x) (1535-1274 x+312 x^2-30 x^3+x^4),
 (-9+x) (-7+x) (1447-1266 x+312 x^2-30 x^3+x^4)}
```

```
{(-9+x) (-7+x) (1735-1298 x+312 x^2-30 x^3+x^4),
 (-7+x) (-15583+13417 x-4106 x^2+582 x^3-39 x^4+x^5),
 (-9+x) (-7+x) (1751-1298 x+312 x^2-30 x^3+x^4),
 (-9+x) (-7+x) (1767-1298 x+312 x^2-30 x^3+x^4),
 (-9+x)^2 (-7+x) (-183+123 x-21 x^2+x^3),
 (-7+x)^2 (2113-1592 x+358 x^2-32 x^3+x^4), (-9+x) (-7+x)
  (1663-1290 x+312 x^2-30 x^3+x^4), (-9+x) (-7+x) (73-18 x+x^2) (23-12 x+x^2),
 (-9+x) (-7+x) (1695-1290 x+312 x^2-30 x^3+x^4), (-9+x)^2 (-7+x)^2 (25-14 x+x^2),
 (-9+x) (-7+x) (1591-1282 x+312 x^2-30 x^3+x^4),
 (-9+x) (-7+x) (1607-1282 x+312 x^2-30 x^3+x^4),
 (-9+x)^2 (-7+x) (-167+123 x-21 x^2+x^3), (-9+x) (-7+x)^2 (-217+151 x-23 x^2+x^3),
 (-9+x) (-7+x) (1535-1274 x+312 x^2-30 x^3+x^4),
 (-9+x) (-7+x) (1447-1266 x+312 x^2-30 x^3+x^4)} // Length
```

```
16
```

```
CoefficientList[{(-9 + x) (-7 + x) (1735 - 1298 x + 312 x^2 - 30 x^3 + x^4),
  (-7 + x) (-15583 + 13417 x - 4106 x^2 + 582 x^3 - 39 x^4 + x^5),
  (-9 + x) (-7 + x) (1751 - 1298 x + 312 x^2 - 30 x^3 + x^4),
  (-9 + x) (-7 + x) (1767 - 1298 x + 312 x^2 - 30 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (-183 + 123 x - 21 x^2 + x^3),
  (-7 + x)^2 (2113 - 1592 x + 358 x^2 - 32 x^3 + x^4), (-9 + x) (-7 + x)
   (1663 - 1290 x + 312 x^2 - 30 x^3 + x^4), (-9 + x) (-7 + x) (73 - 18 x + x^2) (23 - 12 x + x^2),
  (-9 + x) (-7 + x) (1695 - 1290 x + 312 x^2 - 30 x^3 + x^4), (-9 + x)^2 (-7 + x)^2 (25 - 14 x + x^2),
  (-9 + x) (-7 + x) (1591 - 1282 x + 312 x^2 - 30 x^3 + x^4),
  (-9 + x) (-7 + x) (1607 - 1282 x + 312 x^2 - 30 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (-167 + 123 x - 21 x^2 + x^3), (-9 + x) (-7 + x)^2 (-217 + 151 x - 23 x^2 + x^3),
  (-9 + x) (-7 + x) (1535 - 1274 x + 312 x^2 - 30 x^3 + x^4),
  (-9 + x) (-7 + x) (1447 - 1266 x + 312 x^2 - 30 x^3 + x^4)}, x]
```

```
{{109305, -109534, 42159, -8180, 855, -46, 1},
 {109081, -109502, 42159, -8180, 855, -46, 1},
 {110313, -109790, 42175, -8180, 855, -46, 1},
 {111321, -110046, 42191, -8180, 855, -46, 1},
 {103761, -107622, 41943, -8172, 855, -46, 1},
 {103537, -107590, 41943, -8172, 855, -46, 1},
 {104769, -107878, 41959, -8172, 855, -46, 1},
 {105777, -108134, 41975, -8172, 855, -46, 1},
 {106785, -108390, 41991, -8172, 855, -46, 1},
 {99225, -105966, 41743, -8164, 855, -46, 1},
 {100233, -106222, 41759, -8164, 855, -46, 1},
 {101241, -106478, 41775, -8164, 855, -46, 1},
 {94689, -104310, 41543, -8156, 855, -46, 1},
 {95697, -104566, 41559, -8156, 855, -46, 1},
 {96705, -104822, 41575, -8156, 855, -46, 1},
 {91161, -102910, 41359, -8148, 855, -46, 1}}
```

```
A = {{109305, -109534, 42159, -8180, 855, -46, 1},
   {109081, -109502, 42159, -8180, 855, -46, 1}, {110313, -109790, 42175,
    -8180, 855, -46, 1}, {111321, -110046, 42191, -8180, 855, -46, 1},
   {103761, -107622, 41943, -8172, 855, -46, 1}, {103537, -107590, 41943,
    -8172, 855, -46, 1}, {104769, -107878, 41959, -8172, 855, -46, 1},
   {105777, -108134, 41975, -8172, 855, -46, 1}, {106785, -108390, 41991,
    -8172, 855, -46, 1}, {99225, -105966, 41743, -8164, 855, -46, 1},
   {100233, -106222, 41759, -8164, 855, -46, 1}, {101241, -106478, 41775,
    -8164, 855, -46, 1}, {94689, -104310, 41543, -8156, 855, -46, 1},
   {95697, -104566, 41559, -8156, 855, -46, 1}, {96705, -104822, 41575,
    -8156, 855, -46, 1}, {91161, -102910, 41359, -8148, 855, -46, 1}};
```

```
CoefficientList[D[poly4, x] / p4 // Factor, x]
```

```
{4493145, -4488726, 1727503, -335308, 35055, -1886, 41}
```

```
Solve[
 Array[n, 16].{{109 305, -109 534, 42 159, -8180, 855, -46, 1}, {109 081, -109 502,
     42 159, -8180, 855, -46, 1}, {110 313, -109 790, 42 175, -8180, 855, -46, 1},
    {111 321, -110 046, 42 191, -8180, 855, -46, 1}, {103 761, -107 622, 41 943,
     -8172, 855, -46, 1}, {103 537, -107 590, 41 943, -8172, 855, -46, 1},
    {104 769, -107 878, 41 959, -8172, 855, -46, 1}, {105 777, -108 134, 41 975,
     -8172, 855, -46, 1}, {106 785, -108 390, 41 991, -8172, 855, -46, 1},
    {99 225, -105 966, 41 743, -8164, 855, -46, 1}, {100 233, -106 222, 41 759,
     -8164, 855, -46, 1}, {101 241, -106 478, 41 775, -8164, 855, -46, 1},
    {94 689, -104 310, 41 543, -8156, 855, -46, 1}, {95 697, -104 566, 41 559,
     -8156, 855, -46, 1}, {96 705, -104 822, 41 575, -8156, 855, -46, 1},
    {91 161, -102 910, 41 359, -8148, 855, -46, 1}} ==
  {4 493 145, -4 488 726, 1 727 503, -335 308, 35 055, -1886, 41}, Array[n, 16]]
{}

MatrixForm[{{109 305, -109 534, 42 159, -8180, 855, -46, 1},
  {109 081, -109 502, 42 159, -8180, 855, -46, 1},
  {110 313, -109 790, 42 175, -8180, 855, -46, 1},
  {111 321, -110 046, 42 191, -8180, 855, -46, 1},
  {103 761, -107 622, 41 943, -8172, 855, -46, 1},
  {103 537, -107 590, 41 943, -8172, 855, -46, 1},
  {104 769, -107 878, 41 959, -8172, 855, -46, 1},
  {105 777, -108 134, 41 975, -8172, 855, -46, 1},
  {106 785, -108 390, 41 991, -8172, 855, -46, 1},
  {99 225, -105 966, 41 743, -8164, 855, -46, 1},
  {100 233, -106 222, 41 759, -8164, 855, -46, 1},
  {101 241, -106 478, 41 775, -8164, 855, -46, 1},
  {94 689, -104 310, 41 543, -8156, 855, -46, 1},
  {95 697, -104 566, 41 559, -8156, 855, -46, 1},
  {96 705, -104 822, 41 575, -8156, 855, -46, 1},
  {91 161, -102 910, 41 359, -8148, 855, -46, 1}}]
```

$$\begin{pmatrix} 109\,305 & -109\,534 & 42\,159 & -8180 & 855 & -46 & 1 \\ 109\,081 & -109\,502 & 42\,159 & -8180 & 855 & -46 & 1 \\ 110\,313 & -109\,790 & 42\,175 & -8180 & 855 & -46 & 1 \\ 111\,321 & -110\,046 & 42\,191 & -8180 & 855 & -46 & 1 \\ 103\,761 & -107\,622 & 41\,943 & -8172 & 855 & -46 & 1 \\ 103\,537 & -107\,590 & 41\,943 & -8172 & 855 & -46 & 1 \\ 104\,769 & -107\,878 & 41\,959 & -8172 & 855 & -46 & 1 \\ 105\,777 & -108\,134 & 41\,975 & -8172 & 855 & -46 & 1 \\ 106\,785 & -108\,390 & 41\,991 & -8172 & 855 & -46 & 1 \\ 99\,225 & -105\,966 & 41\,743 & -8164 & 855 & -46 & 1 \\ 100\,233 & -106\,222 & 41\,759 & -8164 & 855 & -46 & 1 \\ 101\,241 & -106\,478 & 41\,775 & -8164 & 855 & -46 & 1 \\ 94\,689 & -104\,310 & 41\,543 & -8156 & 855 & -46 & 1 \\ 95\,697 & -104\,566 & 41\,559 & -8156 & 855 & -46 & 1 \\ 96\,705 & -104\,822 & 41\,575 & -8156 & 855 & -46 & 1 \\ 91\,161 & -102\,910 & 41\,359 & -8148 & 855 & -46 & 1 \end{pmatrix}$$

```
Array[m, 7].Transpose[A]
```

```
{109 305 m[1] - 109 534 m[2] + 42 159 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7],
 109 081 m[1] - 109 502 m[2] + 42 159 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7],
 110 313 m[1] - 109 790 m[2] + 42 175 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7],
 111 321 m[1] - 110 046 m[2] + 42 191 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7],
 103 761 m[1] - 107 622 m[2] + 41 943 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7],
 103 537 m[1] - 107 590 m[2] + 41 943 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7],
 104 769 m[1] - 107 878 m[2] + 41 959 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7],
 105 777 m[1] - 108 134 m[2] + 41 975 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7],
 106 785 m[1] - 108 390 m[2] + 41 991 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7],
 99 225 m[1] - 105 966 m[2] + 41 743 m[3] - 8164 m[4] + 855 m[5] - 46 m[6] + m[7],
 100 233 m[1] - 106 222 m[2] + 41 759 m[3] - 8164 m[4] + 855 m[5] - 46 m[6] + m[7],
 101 241 m[1] - 106 478 m[2] + 41 775 m[3] - 8164 m[4] + 855 m[5] - 46 m[6] + m[7],
 94 689 m[1] - 104 310 m[2] + 41 543 m[3] - 8156 m[4] + 855 m[5] - 46 m[6] + m[7],
 95 697 m[1] - 104 566 m[2] + 41 559 m[3] - 8156 m[4] + 855 m[5] - 46 m[6] + m[7],
 96 705 m[1] - 104 822 m[2] + 41 575 m[3] - 8156 m[4] + 855 m[5] - 46 m[6] + m[7],
 91 161 m[1] - 102 910 m[2] + 41 359 m[3] - 8148 m[4] + 855 m[5] - 46 m[6] + m[7]}
```

```
Array[m, 7].{4 493 145, -4 488 726, 1 727 503, -335 308, 35 055, -1886, 41}
```

```
4 493 145 m[1] - 4 488 726 m[2] + 1 727 503 m[3] -
 335 308 m[4] + 35 055 m[5] - 1886 m[6] + 41 m[7]
```

```
FindInstance[
 109 305 m[1] - 109 534 m[2] + 42 159 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  109 081 m[1] - 109 502 m[2] + 42 159 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  110 313 m[1] - 109 790 m[2] + 42 175 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  111 321 m[1] - 110 046 m[2] + 42 191 m[3] - 8180 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  103 761 m[1] - 107 622 m[2] + 41 943 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  103 537 m[1] - 107 590 m[2] + 41 943 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  104 769 m[1] - 107 878 m[2] + 41 959 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  105 777 m[1] - 108 134 m[2] + 41 975 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  106 785 m[1] - 108 390 m[2] + 41 991 m[3] - 8172 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  99 225 m[1] - 105 966 m[2] + 41 743 m[3] - 8164 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  100 233 m[1] - 106 222 m[2] + 41 759 m[3] - 8164 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  101 241 m[1] - 106 478 m[2] + 41 775 m[3] - 8164 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  94 689 m[1] - 104 310 m[2] + 41 543 m[3] - 8156 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  95 697 m[1] - 104 566 m[2] + 41 559 m[3] - 8156 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  96 705 m[1] - 104 822 m[2] + 41 575 m[3] - 8156 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  91 161 m[1] - 102 910 m[2] + 41 359 m[3] - 8148 m[4] + 855 m[5] - 46 m[6] + m[7] ≥ 0 &&
  4 493 145 m[1] - 4 488 726 m[2] + 1 727 503 m[3] - 335 308 m[4] +
    35 055 m[5] - 1886 m[6] + 41 m[7] < 0, Array[m, 7], Integers]
```

```
{{m[1] → -5561, m[2] → -31 263,
  m[3] → -149 845, m[4] → -427 982, m[5] → 0, m[6] → 0, m[7] → 0}}
```

```
Array[m, 7] /. {m[1] → -5561, m[2] → -31 263,
  m[3] → -149 845, m[4] → -427 982, m[5] → 0, m[6] → 0, m[7] → 0}
```

```
{-5561, -31 263, -149 845, -427 982, 0, 0, 0}
```

```
GCD[-5561, -31 263, -149 845, -427 982, 0, 0, 0]
```

```
1
```

```
Solve[Array[n, 16].A == {4 493 145, -4 488 726, 1 727 503, -335 308, 35 055, -1886, 41},
 Array[n, 16]]
```

```
{}
```

```
MatrixRank[A]
```

```
4
```

```
{-5561, -31 263, -149 845, -427 982, 0, 0, 0}.
 {4 493 145, -4 488 726, 1 727 503, -335 308, 35 055, -1886, 41}
```

```
-7 236 986
```

```
{-5561, -31 263, -149 845, -427 982, 0, 0, 0}.
```

$$\text{Transpose}\left[\begin{pmatrix} 109\,305 & -109\,534 & 42\,159 & -8180 & 855 & -46 & 1 \\ 109\,081 & -109\,502 & 42\,159 & -8180 & 855 & -46 & 1 \\ 110\,313 & -109\,790 & 42\,175 & -8180 & 855 & -46 & 1 \\ 111\,321 & -110\,046 & 42\,191 & -8180 & 855 & -46 & 1 \\ 103\,761 & -107\,622 & 41\,943 & -8172 & 855 & -46 & 1 \\ 103\,537 & -107\,590 & 41\,943 & -8172 & 855 & -46 & 1 \\ 104\,769 & -107\,878 & 41\,959 & -8172 & 855 & -46 & 1 \\ 105\,777 & -108\,134 & 41\,975 & -8172 & 855 & -46 & 1 \\ 106\,785 & -108\,390 & 41\,991 & -8172 & 855 & -46 & 1 \\ 99\,225 & -105\,966 & 41\,743 & -8164 & 855 & -46 & 1 \\ 100\,233 & -106\,222 & 41\,759 & -8164 & 855 & -46 & 1 \\ 101\,241 & -106\,478 & 41\,775 & -8164 & 855 & -46 & 1 \\ 94\,689 & -104\,310 & 41\,543 & -8156 & 855 & -46 & 1 \\ 95\,697 & -104\,566 & 41\,559 & -8156 & 855 & -46 & 1 \\ 96\,705 & -104\,822 & 41\,575 & -8156 & 855 & -46 & 1 \\ 91\,161 & -102\,910 & 41\,359 & -8148 & 855 & -46 & 1 \end{pmatrix}\right]$$

```
{93 742, 338 990, 94 062, 94 382, 91 734, 336 982, 92 054,
 92 374, 92 694, 90 046, 90 366, 90 686, 88 358, 88 678, 88 998, 86 990}
```

```
poly5 = listmod128[[5]]
```

$$(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\left(-544+213\,x-26\,x^2+x^3\right)$$

```
p5 = poly5 / minipoly[poly5] // Factor
```

$$(-9+x)^3\,(-7+x)^8\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-9 + x)^4 (-7 + x)^9 (5 + x)^25 (-544 + 213 x - 26 x^2 + x^3)]
```

$$\{(-9+x)\left(1353-1052\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)\left(1369-1052\,x+270\,x^2-28\,x^3+x^4\right),\ (-9+x)(-7+x)\left(-183+123\,x-21\,x^2+x^3\right),$$
$$(-9+x)\left(1297-1044\,x+270\,x^2-28\,x^3+x^4\right),\ (-9+x)\left(1313-1044\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)\left(1329-1044\,x+270\,x^2-28\,x^3+x^4\right),\ (-9+x)(-7+x)^2\left(25-14\,x+x^2\right),$$
$$(-9+x)\left(73-18\,x+x^2\right)\left(17-10\,x+x^2\right),\ (-9+x)\left(1257-1036\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)\left(1273-1036\,x+270\,x^2-28\,x^3+x^4\right),\ (-9+x)(-7+x)\left(-167+123\,x-21\,x^2+x^3\right),$$
$$(-9+x)\left(1185-1028\,x+270\,x^2-28\,x^3+x^4\right),\ (-9+x)\left(1201-1028\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)(-7+x)\left(-159+123\,x-21\,x^2+x^3\right),\ (-9+x)\left(1129-1020\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)\left(1145-1020\,x+270\,x^2-28\,x^3+x^4\right),\ (-9+x)(-7+x)\left(-151+123\,x-21\,x^2+x^3\right),$$
$$(-9+x)\left(1073-1012\,x+270\,x^2-28\,x^3+x^4\right),\ (-11+x)(-9+x)(-7+x)\left(13-10\,x+x^2\right)\}$$

```
{(-9 + x) (1353 - 1052 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1369 - 1052 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-183 + 123 x - 21 x^2 + x^3), (-9 + x) (1297 - 1044 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (1313 - 1044 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1329 - 1044 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (25 - 14 x + x^2), (-9 + x) (73 - 18 x + x^2) (17 - 10 x + x^2),
  (-9 + x) (1257 - 1036 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1273 - 1036 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-167 + 123 x - 21 x^2 + x^3), (-9 + x) (1185 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (1201 - 1028 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (-7 + x) (-159 + 123 x - 21 x^2 + x^3),
  (-9 + x) (1129 - 1020 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1145 - 1020 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-151 + 123 x - 21 x^2 + x^3), (-9 + x) (1073 - 1012 x + 270 x^2 - 28 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x) (13 - 10 x + x^2)} // Length
```

```
19
```

```
CoefficientList[
 {(-9 + x) (1353 - 1052 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1369 - 1052 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-183 + 123 x - 21 x^2 + x^3), (-9 + x) (1297 - 1044 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (1313 - 1044 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1329 - 1044 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (25 - 14 x + x^2), (-9 + x) (73 - 18 x + x^2) (17 - 10 x + x^2),
  (-9 + x) (1257 - 1036 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1273 - 1036 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-167 + 123 x - 21 x^2 + x^3), (-9 + x) (1185 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (1201 - 1028 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (-7 + x) (-159 + 123 x - 21 x^2 + x^3),
  (-9 + x) (1129 - 1020 x + 270 x^2 - 28 x^3 + x^4), (-9 + x) (1145 - 1020 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-151 + 123 x - 21 x^2 + x^3), (-9 + x) (1073 - 1012 x + 270 x^2 - 28 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x) (13 - 10 x + x^2)}, x]
```

```
{{-12177, 10821, -3482, 522, -37, 1},
 {-12321, 10837, -3482, 522, -37, 1}, {-11529, 10677, -3474, 522, -37, 1},
 {-11673, 10693, -3474, 522, -37, 1}, {-11817, 10709, -3474, 522, -37, 1},
 {-11961, 10725, -3474, 522, -37, 1}, {-11025, 10549, -3466, 522, -37, 1},
 {-11169, 10565, -3466, 522, -37, 1}, {-11313, 10581, -3466, 522, -37, 1},
 {-11457, 10597, -3466, 522, -37, 1}, {-10521, 10421, -3458, 522, -37, 1},
 {-10665, 10437, -3458, 522, -37, 1}, {-10809, 10453, -3458, 522, -37, 1},
 {-10017, 10293, -3450, 522, -37, 1}, {-10161, 10309, -3450, 522, -37, 1},
 {-10305, 10325, -3450, 522, -37, 1}, {-9513, 10165, -3442, 522, -37, 1},
 {-9657, 10181, -3442, 522, -37, 1}, {-9009, 10037, -3434, 522, -37, 1}}
```

```
A = {{-12177, 10821, -3482, 522, -37, 1},
   {-12321, 10837, -3482, 522, -37, 1}, {-11529, 10677, -3474, 522, -37, 1},
   {-11673, 10693, -3474, 522, -37, 1}, {-11817, 10709, -3474, 522, -37, 1},
   {-11961, 10725, -3474, 522, -37, 1}, {-11025, 10549, -3466, 522, -37, 1},
   {-11169, 10565, -3466, 522, -37, 1}, {-11313, 10581, -3466, 522, -37, 1},
   {-11457, 10597, -3466, 522, -37, 1}, {-10521, 10421, -3458, 522, -37, 1},
   {-10665, 10437, -3458, 522, -37, 1}, {-10809, 10453, -3458, 522, -37, 1},
   {-10017, 10293, -3450, 522, -37, 1}, {-10161, 10309, -3450, 522, -37, 1},
   {-10305, 10325, -3450, 522, -37, 1}, {-9513, 10165, -3442, 522, -37, 1},
   {-9657, 10181, -3442, 522, -37, 1}, {-9009, 10037, -3434, 522, -37, 1}};
```

```
MatrixRank[A]
```

```
3
```

```
CoefficientList[D[poly5, x] / p5 // Factor, x]
```

```
{-493225, 440925, -142538, 21402, -1517, 41}
```

```
Solve[Array[n, 19].{{-12 177, 10 821, -3482, 522, -37, 1},
    {-12 321, 10 837, -3482, 522, -37, 1}, {-11 529, 10 677, -3474, 522, -37, 1},
    {-11 673, 10 693, -3474, 522, -37, 1}, {-11 817, 10 709, -3474, 522, -37, 1},
    {-11 961, 10 725, -3474, 522, -37, 1}, {-11 025, 10 549, -3466, 522, -37, 1},
    {-11 169, 10 565, -3466, 522, -37, 1}, {-11 313, 10 581, -3466, 522, -37, 1},
    {-11 457, 10 597, -3466, 522, -37, 1}, {-10 521, 10 421, -3458, 522, -37, 1},
    {-10 665, 10 437, -3458, 522, -37, 1}, {-10 809, 10 453, -3458, 522, -37, 1},
    {-10 017, 10 293, -3450, 522, -37, 1}, {-10 161, 10 309, -3450, 522, -37, 1},
    {-10 305, 10 325, -3450, 522, -37, 1}, {-9513, 10 165, -3442, 522, -37, 1},
    {-9657, 10 181, -3442, 522, -37, 1}, {-9009, 10 037, -3434, 522, -37, 1}} ==
  {-493 225, 440 925, -142 538, 21 402, -1517, 41}, Array[n, 19]]
```

```
{}
```

```
Array[m, 6].Transpose[A]
```

```
{-12 177 m[1] + 10 821 m[2] - 3482 m[3] + 522 m[4] - 37 m[5] + m[6],
 -12 321 m[1] + 10 837 m[2] - 3482 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 529 m[1] + 10 677 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 673 m[1] + 10 693 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 817 m[1] + 10 709 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 961 m[1] + 10 725 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 025 m[1] + 10 549 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 169 m[1] + 10 565 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 313 m[1] + 10 581 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6],
 -11 457 m[1] + 10 597 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6],
 -10 521 m[1] + 10 421 m[2] - 3458 m[3] + 522 m[4] - 37 m[5] + m[6],
 -10 665 m[1] + 10 437 m[2] - 3458 m[3] + 522 m[4] - 37 m[5] + m[6],
 -10 809 m[1] + 10 453 m[2] - 3458 m[3] + 522 m[4] - 37 m[5] + m[6],
 -10 017 m[1] + 10 293 m[2] - 3450 m[3] + 522 m[4] - 37 m[5] + m[6],
 -10 161 m[1] + 10 309 m[2] - 3450 m[3] + 522 m[4] - 37 m[5] + m[6],
 -10 305 m[1] + 10 325 m[2] - 3450 m[3] + 522 m[4] - 37 m[5] + m[6],
 -9513 m[1] + 10 165 m[2] - 3442 m[3] + 522 m[4] - 37 m[5] + m[6],
 -9657 m[1] + 10 181 m[2] - 3442 m[3] + 522 m[4] - 37 m[5] + m[6],
 -9009 m[1] + 10 037 m[2] - 3434 m[3] + 522 m[4] - 37 m[5] + m[6]}
```

```
Array[m, 6].{-493 225, 440 925, -142 538, 21 402, -1517, 41}
```

```
-493 225 m[1] + 440 925 m[2] - 142 538 m[3] + 21 402 m[4] - 1517 m[5] + 41 m[6]
```

```
FindInstance[-12 177 m[1] + 10 821 m[2] - 3482 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -12 321 m[1] + 10 837 m[2] - 3482 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 529 m[1] + 10 677 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 673 m[1] + 10 693 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 817 m[1] + 10 709 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 961 m[1] + 10 725 m[2] - 3474 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 025 m[1] + 10 549 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 169 m[1] + 10 565 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 313 m[1] + 10 581 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11 457 m[1] + 10 597 m[2] - 3466 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -10 521 m[1] + 10 421 m[2] - 3458 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -10 665 m[1] + 10 437 m[2] - 3458 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -10 809 m[1] + 10 453 m[2] - 3458 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -10 017 m[1] + 10 293 m[2] - 3450 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -10 161 m[1] + 10 309 m[2] - 3450 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -10 305 m[1] + 10 325 m[2] - 3450 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -9513 m[1] + 10 165 m[2] - 3442 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -9657 m[1] + 10 181 m[2] - 3442 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -9009 m[1] + 10 037 m[2] - 3434 m[3] + 522 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -493 225 m[1] + 440 925 m[2] - 142 538 m[3] + 21 402 m[4] - 1517 m[5] + 41 m[6] < 0,
  Array[m, 6], Integers]
```

```
{{m[1] → 2454, m[2] → 22 092, m[3] → 198 820, m[4] → 0, m[5] → 0, m[6] → 483 133 968}}
```

```
Array[m, 6] /.
  {m[1] → 2454, m[2] → 22 092, m[3] → 198 820, m[4] → 0, m[5] → 0, m[6] → 483 133 968}
```

```
{2454, 22 092, 198 820, 0, 0, 483 133 968}
```

```
GCD[2454, 22 092, 198 820, 0, 0, 483 133 968]
```

```
2
```

```
{1227, 11 046, 99 410, 0, 0, 241 566 984} // Reverse
```

```
{241 566 984, 0, 0, 99 410, 11 046, 1227}
```

```
{2454, 22 092, 198 820, 0, 0, 483 133 968} / 2
```

```
{1227, 11 046, 99 410, 0, 0, 241 566 984}
```

```
{1227, 11 046, 99 410, 0, 0, 241 566 984}.
  {-493 225, 440 925, -142 538, 21 402, -1517, 41}
```

```
-185 761
```

```
{1227, 11046, 99410, 0, 0, 241566984}.
 Transpose[{{-12177, 10821, -3482, 522, -37, 1},
   {-12321, 10837, -3482, 522, -37, 1}, {-11529, 10677, -3474, 522, -37, 1},
   {-11673, 10693, -3474, 522, -37, 1}, {-11817, 10709, -3474, 522, -37, 1},
   {-11961, 10725, -3474, 522, -37, 1}, {-11025, 10549, -3466, 522, -37, 1},
   {-11169, 10565, -3466, 522, -37, 1}, {-11313, 10581, -3466, 522, -37, 1},
   {-11457, 10597, -3466, 522, -37, 1}, {-10521, 10421, -3458, 522, -37, 1},
   {-10665, 10437, -3458, 522, -37, 1}, {-10809, 10453, -3458, 522, -37, 1},
   {-10017, 10293, -3450, 522, -37, 1}, {-10161, 10309, -3450, 522, -37, 1},
   {-10305, 10325, -3450, 522, -37, 1}, {-9513, 10165, -3442, 522, -37, 1},
   {-9657, 10181, -3442, 522, -37, 1}, {-9009, 10037, -3434, 522, -37, 1}}]
{8951, 8999, 8703, 8751, 8799, 8847, 8503, 8551, 8599,
 8647, 8303, 8351, 8399, 8103, 8151, 8199, 7903, 7951, 7703}

{2454, 22092, 198820, 0, 0, 483133968}.Transpose[A]
{17902, 17998, 17406, 17502, 17598, 17694, 17006, 17102, 17198,
 17294, 16606, 16702, 16798, 16206, 16302, 16398, 15806, 15902, 15406}

{2454, 22092, 198820, 0, 0, 483133968}.
 {-493225, 440925, -142538, 21402, -1517, 41}
-371522

poly6 = listmod128[[6]]
(-11 + x) (-9 + x)^3 (-7 + x)^10 (5 + x)^25 (64 - 17 x + x^2)

p6 = poly6 / minipoly[poly6] // Factor
(-9 + x)^2 (-7 + x)^9 (5 + x)^24

feasiblesubcharpolylist[(-11 + x) (-9 + x)^3 (-7 + x)^10 (5 + x)^25 (64 - 17 x + x^2)]
{(-11 + x) (1453 - 1092 x + 274 x^2 - 28 x^3 + x^4),
 (-11 + x) (-7 + x) (-195 + 127 x - 21 x^2 + x^3), (-11 + x) (1381 - 1084 x + 274 x^2 - 28 x^3 + x^4),
 (-11 + x)^2 (-127 + 87 x - 17 x^2 + x^3), (-11 + x)^2 (-7 + x) (17 - 10 x + x^2),
 (-11 + x) (1325 - 1076 x + 274 x^2 - 28 x^3 + x^4), (-11 + x) (-9 + x) (-149 + 103 x - 19 x^2 + x^3),
 (-9 + x) (1535 - 1274 x + 312 x^2 - 30 x^3 + x^4), (-11 + x) (-7 + x) (-179 + 127 x - 21 x^2 + x^3),
 (-11 + x) (-9 + x) (-141 + 103 x - 19 x^2 + x^3), (-11 + x) (-9 + x) (-7 + x) (19 - 12 x + x^2)}
```

```
{(-11 + x) (1453 - 1092 x + 274 x^2 - 28 x^3 + x^4), (-11 + x) (-7 + x) (-195 + 127 x - 21 x^2 + x^3),
  (-11 + x) (1381 - 1084 x + 274 x^2 - 28 x^3 + x^4), (-11 + x)^2 (-127 + 87 x - 17 x^2 + x^3),
  (-11 + x)^2 (-7 + x) (17 - 10 x + x^2), (-11 + x) (1325 - 1076 x + 274 x^2 - 28 x^3 + x^4),
  (-11 + x) (-9 + x) (-149 + 103 x - 19 x^2 + x^3),
  (-9 + x) (1535 - 1274 x + 312 x^2 - 30 x^3 + x^4), (-11 + x) (-7 + x) (-179 + 127 x - 21 x^2 + x^3),
  (-11 + x) (-9 + x) (-141 + 103 x - 19 x^2 + x^3),
  (-11 + x) (-9 + x) (-7 + x) (19 - 12 x + x^2)} // Length
```

```
11
```

```
CoefficientList[{(-11 + x) (1453 - 1092 x + 274 x^2 - 28 x^3 + x^4),
  (-11 + x) (-7 + x) (-195 + 127 x - 21 x^2 + x^3),
  (-11 + x) (1381 - 1084 x + 274 x^2 - 28 x^3 + x^4), (-11 + x)^2 (-127 + 87 x - 17 x^2 + x^3),
  (-11 + x)^2 (-7 + x) (17 - 10 x + x^2), (-11 + x) (1325 - 1076 x + 274 x^2 - 28 x^3 + x^4),
  (-11 + x) (-9 + x) (-149 + 103 x - 19 x^2 + x^3), (-9 + x) (1535 - 1274 x + 312 x^2 - 30 x^3 + x^4),
  (-11 + x) (-7 + x) (-179 + 127 x - 21 x^2 + x^3), (-11 + x) (-9 + x)
   (-141 + 103 x - 19 x^2 + x^3), (-11 + x) (-9 + x) (-7 + x) (19 - 12 x + x^2)}, x]
```

```
{{-15983, 13465, -4106, 582, -39, 1},
 {-15015, 13289, -4098, 582, -39, 1}, {-15191, 13305, -4098, 582, -39, 1},
 {-15367, 13321, -4098, 582, -39, 1}, {-14399, 13145, -4090, 582, -39, 1},
 {-14575, 13161, -4090, 582, -39, 1}, {-14751, 13177, -4090, 582, -39, 1},
 {-13815, 13001, -4082, 582, -39, 1}, {-13783, 13001, -4082, 582, -39, 1},
 {-13959, 13017, -4082, 582, -39, 1}, {-13167, 12857, -4074, 582, -39, 1}}
```

```
A = {{-15983, 13465, -4106, 582, -39, 1},
   {-15015, 13289, -4098, 582, -39, 1}, {-15191, 13305, -4098, 582, -39, 1},
   {-15367, 13321, -4098, 582, -39, 1}, {-14399, 13145, -4090, 582, -39, 1},
   {-14575, 13161, -4090, 582, -39, 1}, {-14751, 13177, -4090, 582, -39, 1},
   {-13815, 13001, -4082, 582, -39, 1}, {-13783, 13001, -4082, 582, -39, 1},
   {-13959, 13017, -4082, 582, -39, 1}, {-13167, 12857, -4074, 582, -39, 1}};
```

```
CoefficientList[D[poly6, x] / p6 // Factor, x]
```

```
{-639015, 548097, -168122, 23862, -1599, 41}
```

```
Solve[Array[n, 11].{{-15983, 13465, -4106, 582, -39, 1},
    {-15015, 13289, -4098, 582, -39, 1}, {-15191, 13305, -4098, 582, -39, 1},
    {-15367, 13321, -4098, 582, -39, 1}, {-14399, 13145, -4090, 582, -39, 1},
    {-14575, 13161, -4090, 582, -39, 1}, {-14751, 13177, -4090, 582, -39, 1},
    {-13815, 13001, -4082, 582, -39, 1}, {-13783, 13001, -4082, 582, -39, 1},
    {-13959, 13017, -4082, 582, -39, 1}, {-13167, 12857, -4074, 582, -39, 1}} ==
  {-639015, 548097, -168122, 23862, -1599, 41}, Array[n, 11]]
```

```
Solve::svars : Equations may not give solutions for all "solve" variables. >>
```

```
{{n[8] → 8, n[9] → 42 - 2 n[1] - 3 n[2] - 2 n[3] - n[4] - 2 n[5] - n[6],
  n[10] → 86 - 2 n[1] - n[3] - 2 n[4] - n[6] - 2 n[7],
  n[11] → -95 + 3 n[1] + 2 n[2] + 2 n[3] + 2 n[4] + n[5] + n[6] + n[7]}}
```

```
FindInstance[
 -n[8] + 8 == 0 && -n[9] + 42 - 2 n[1] - 3 n[2] - 2 n[3] - n[4] - 2 n[5] - n[6] == 0 &&
  -n[10] - 86 - 2 n[1] - n[3] - 2 n[4] - n[6] - 2 n[7] == 0 &&
  -n[11] - 95 + 3 n[1] + 2 n[2] + 2 n[3] + 2 n[4] + n[5] + n[6] + n[7] == 0 &&
  n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 && n[7] ≥ 0 &&
  n[8] ≥ 0 && n[9] ≥ 0 && n[10] ≥ 0 && n[11] ≥ 0, Array[n, 11], Integers]
```

```
{}
```

```
Array[m, 6].Transpose[A]
```

```
{-15 983 m[1] + 13 465 m[2] - 4106 m[3] + 582 m[4] - 39 m[5] + m[6],
 -15 015 m[1] + 13 289 m[2] - 4098 m[3] + 582 m[4] - 39 m[5] + m[6],
 -15 191 m[1] + 13 305 m[2] - 4098 m[3] + 582 m[4] - 39 m[5] + m[6],
 -15 367 m[1] + 13 321 m[2] - 4098 m[3] + 582 m[4] - 39 m[5] + m[6],
 -14 399 m[1] + 13 145 m[2] - 4090 m[3] + 582 m[4] - 39 m[5] + m[6],
 -14 575 m[1] + 13 161 m[2] - 4090 m[3] + 582 m[4] - 39 m[5] + m[6],
 -14 751 m[1] + 13 177 m[2] - 4090 m[3] + 582 m[4] - 39 m[5] + m[6],
 -13 815 m[1] + 13 001 m[2] - 4082 m[3] + 582 m[4] - 39 m[5] + m[6],
 -13 783 m[1] + 13 001 m[2] - 4082 m[3] + 582 m[4] - 39 m[5] + m[6],
 -13 959 m[1] + 13 017 m[2] - 4082 m[3] + 582 m[4] - 39 m[5] + m[6],
 -13 167 m[1] + 12 857 m[2] - 4074 m[3] + 582 m[4] - 39 m[5] + m[6]}
```

```
Array[m, 6].{-639 015, 548 097, -168 122, 23 862, -1599, 41}
```

```
-639 015 m[1] + 548 097 m[2] - 168 122 m[3] + 23 862 m[4] - 1599 m[5] + 41 m[6]
```

```
FindInstance[-15 983 m[1] + 13 465 m[2] - 4106 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -15 015 m[1] + 13 289 m[2] - 4098 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -15 191 m[1] + 13 305 m[2] - 4098 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -15 367 m[1] + 13 321 m[2] - 4098 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -14 399 m[1] + 13 145 m[2] - 4090 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -14 575 m[1] + 13 161 m[2] - 4090 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -14 751 m[1] + 13 177 m[2] - 4090 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -13 815 m[1] + 13 001 m[2] - 4082 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -13 783 m[1] + 13 001 m[2] - 4082 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -13 959 m[1] + 13 017 m[2] - 4082 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -13 167 m[1] + 12 857 m[2] - 4074 m[3] + 582 m[4] - 39 m[5] + m[6] ≥ 0 &&
   -639 015 m[1] + 548 097 m[2] - 168 122 m[3] + 23 862 m[4] - 1599 m[5] + 41 m[6] < 0,
  Array[m, 6], Integers]
```

```
{{m[1] → 2150, m[2] → 10 679, m[3] → 26 648, m[4] → 0, m[5] → 0, m[6] → 0}}
```

```
Array[m, 6] /. {m[1] → 2150, m[2] → 10 679, m[3] → 26 648, m[4] → 0, m[5] → 0, m[6] → 0}
```

```
{2150, 10 679, 26 648, 0, 0, 0}
```

```
GCD[2150, 10 679, 26 648, 0, 0, 0]
```

```
1
```

```
{{-15983, 13465, -4106, 582, -39, 1}, {-15015, 13289, -4098, 582, -39, 1},
  {-15191, 13305, -4098, 582, -39, 1}, {-15367, 13321, -4098, 582, -39, 1},
  {-14399, 13145, -4090, 582, -39, 1}, {-14575, 13161, -4090, 582, -39, 1},
  {-14751, 13177, -4090, 582, -39, 1}, {-13815, 13001, -4082, 582, -39, 1},
  {-13783, 13001, -4082, 582, -39, 1}, {-13959, 13017, -4082, 582, -39, 1},
  {-13167, 12857, -4074, 582, -39, 1}} // MatrixForm
```

$$\begin{pmatrix} -15983 & 13465 & -4106 & 582 & -39 & 1 \\ -15015 & 13289 & -4098 & 582 & -39 & 1 \\ -15191 & 13305 & -4098 & 582 & -39 & 1 \\ -15367 & 13321 & -4098 & 582 & -39 & 1 \\ -14399 & 13145 & -4090 & 582 & -39 & 1 \\ -14575 & 13161 & -4090 & 582 & -39 & 1 \\ -14751 & 13177 & -4090 & 582 & -39 & 1 \\ -13815 & 13001 & -4082 & 582 & -39 & 1 \\ -13783 & 13001 & -4082 & 582 & -39 & 1 \\ -13959 & 13017 & -4082 & 582 & -39 & 1 \\ -13167 & 12857 & -4074 & 582 & -39 & 1 \end{pmatrix}$$

```
{2150, 10679, 26648, 0, 0, 0}.{-639015, 548097, -168122, 23862, -1599, 41}
```

$$-869443$$

```
{2150, 10679, 26648, 0, 0, 0}.Transpose[{{-15983, 13465, -4106, 582, -39, 1},
  {-15015, 13289, -4098, 582, -39, 1}, {-15191, 13305, -4098, 582, -39, 1},
  {-15367, 13321, -4098, 582, -39, 1}, {-14399, 13145, -4090, 582, -39, 1},
  {-14575, 13161, -4090, 582, -39, 1}, {-14751, 13177, -4090, 582, -39, 1},
  {-13815, 13001, -4082, 582, -39, 1}, {-13783, 13001, -4082, 582, -39, 1},
  {-13959, 13017, -4082, 582, -39, 1}, {-13167, 12857, -4074, 582, -39, 1}}]
```

```
{12597, 427477, 219941, 12405, 427285,
 219749, 12213, 358293, 427093, 219557, 426901}
```

```
poly7 = listmod128[[7]]
```

$$(-11+x)^2\,(-9+x)^2\,(-7+x)^{10}\,(5+x)^{25}\,\left(52-15x+x^2\right)$$

```
p7 = poly7 / minipoly[poly7] // Factor
```

$$(-11+x)\,(-9+x)\,(-7+x)^9\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-11+x)^2 (-9+x)^2 (-7+x)^10 (5+x)^25 (52-15x+x^2)]
```

$$\left\{(-11+x)\,(-9+x)\,\left(-127+87x-17x^2+x^3\right),\ (-9+x)^2\,\left(-157+103x-19x^2+x^3\right),\right.$$
$$(-11+x)\,(-9+x)\,(-7+x)\,\left(17-10x+x^2\right),\ (-9+x)\,\left(1325-1076x+274x^2-28x^3+x^4\right),$$
$$(-9+x)^2\,\left(-149+103x-19x^2+x^3\right),\ (-9+x)\,(-7+x)\,\left(-179+127x-21x^2+x^3\right),$$
$$\left.(-9+x)^2\,\left(-141+103x-19x^2+x^3\right),\ (-9+x)^2\,(-7+x)\,\left(19-12x+x^2\right)\right\}$$

```
{(-11 + x) (-9 + x) (-127 + 87 x - 17 x^2 + x^3), (-9 + x)^2 (-157 + 103 x - 19 x^2 + x^3),
  (-11 + x) (-9 + x) (-7 + x) (17 - 10 x + x^2), (-9 + x) (1325 - 1076 x + 274 x^2 - 28 x^3 + x^4),
  (-9 + x)^2 (-149 + 103 x - 19 x^2 + x^3), (-9 + x) (-7 + x) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x)^2 (-141 + 103 x - 19 x^2 + x^3), (-9 + x)^2 (-7 + x) (19 - 12 x + x^2)} // Length
```

```
8
```

```
A = {{-12573, 11153, -3550, 526, -37, 1}, {-12717, 11169, -3550, 526, -37, 1},
    {-11781, 10993, -3542, 526, -37, 1}, {-11925, 11009, -3542, 526, -37, 1},
    {-12069, 11025, -3542, 526, -37, 1}, {-11277, 10865, -3534, 526, -37, 1},
    {-11421, 10881, -3534, 526, -37, 1}, {-10773, 10737, -3526, 526, -37, 1}};
```

```
MatrixRank[A]
```

```
3
```

```
CoefficientList[
 {(-11 + x) (-9 + x) (-127 + 87 x - 17 x^2 + x^3), (-9 + x)^2 (-157 + 103 x - 19 x^2 + x^3),
  (-11 + x) (-9 + x) (-7 + x) (17 - 10 x + x^2), (-9 + x) (1325 - 1076 x + 274 x^2 - 28 x^3 + x^4),
  (-9 + x)^2 (-149 + 103 x - 19 x^2 + x^3), (-9 + x) (-7 + x) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x)^2 (-141 + 103 x - 19 x^2 + x^3), (-9 + x)^2 (-7 + x) (19 - 12 x + x^2)}, x]
```

```
{{-12573, 11153, -3550, 526, -37, 1}, {-12717, 11169, -3550, 526, -37, 1},
 {-11781, 10993, -3542, 526, -37, 1}, {-11925, 11009, -3542, 526, -37, 1},
 {-12069, 11025, -3542, 526, -37, 1}, {-11277, 10865, -3534, 526, -37, 1},
 {-11421, 10881, -3534, 526, -37, 1}, {-10773, 10737, -3526, 526, -37, 1}}
```

```
CoefficientList[D[poly7, x] / p7 // Factor, x]
```

```
{-518725, 457225, -145502, 21566, -1517, 41}
```

```
Solve[Array[n, 8].
   {{-12573, 11153, -3550, 526, -37, 1}, {-12717, 11169, -3550, 526, -37, 1},
    {-11781, 10993, -3542, 526, -37, 1}, {-11925, 11009, -3542, 526, -37, 1},
    {-12069, 11025, -3542, 526, -37, 1}, {-11277, 10865, -3534, 526, -37, 1},
    {-11421, 10881, -3534, 526, -37, 1}, {-10773, 10737, -3526, 526, -37, 1}} ==
  {-518725, 457225, -145502, 21566, -1517, 41}, Array[n, 8]]
```

```
{}
```

```
Array[m, 6].Transpose[A]
```

```
{-12573 m[1] + 11153 m[2] - 3550 m[3] + 526 m[4] - 37 m[5] + m[6],
 -12717 m[1] + 11169 m[2] - 3550 m[3] + 526 m[4] - 37 m[5] + m[6],
 -11781 m[1] + 10993 m[2] - 3542 m[3] + 526 m[4] - 37 m[5] + m[6],
 -11925 m[1] + 11009 m[2] - 3542 m[3] + 526 m[4] - 37 m[5] + m[6],
 -12069 m[1] + 11025 m[2] - 3542 m[3] + 526 m[4] - 37 m[5] + m[6],
 -11277 m[1] + 10865 m[2] - 3534 m[3] + 526 m[4] - 37 m[5] + m[6],
 -11421 m[1] + 10881 m[2] - 3534 m[3] + 526 m[4] - 37 m[5] + m[6],
 -10773 m[1] + 10737 m[2] - 3526 m[3] + 526 m[4] - 37 m[5] + m[6]}
```

```
Array[m, 6].{-518725, 457225, -145502, 21566, -1517, 41}
```

```
-518725 m[1] + 457225 m[2] - 145502 m[3] + 21566 m[4] - 1517 m[5] + 41 m[6]
```

```
FindInstance[-12573 m[1] + 11153 m[2] - 3550 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -12717 m[1] + 11169 m[2] - 3550 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11781 m[1] + 10993 m[2] - 3542 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11925 m[1] + 11009 m[2] - 3542 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -12069 m[1] + 11025 m[2] - 3542 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11277 m[1] + 10865 m[2] - 3534 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -11421 m[1] + 10881 m[2] - 3534 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -10773 m[1] + 10737 m[2] - 3526 m[3] + 526 m[4] - 37 m[5] + m[6] ≥ 0 &&
   -518725 m[1] + 457225 m[2] - 145502 m[3] + 21566 m[4] - 1517 m[5] + 41 m[6] < 0,
  Array[m, 6], Integers]
{{m[1] → 2995, m[2] → 15614, m[3] → 38390, m[4] → 0, m[5] → 0, m[6] → 0}}

Array[m, 6] /. {m[1] → 2995, m[2] → 15614, m[3] → 38390, m[4] → 0, m[5] → 0, m[6] → 0}
{2995, 15614, 38390, 0, 0, 0}

GCD[2995, 15614, 38390, 0, 0, 0]
1

A.{2995, 15614, 38390, 0, 0, 0}
{202307, 20851, 383227, 201771, 20315, 201235, 19779, 19243}

{-518725, 457225, -145502, 21566, -1517, 41}.{2995, 15614, 38390, 0, 0, 0}
-292005

{2995, 15614, 38390, 0, 0, 0}.{-518725, 457225, -145502, 21566, -1517, 41}
-292005

poly8 = listmod128[[8]]
(-11 + x) (-9 + x)^2 (-8 + x) (-7 + x)^8 (5 + x)^25 (59 - 16 x + x^2)^2

p8 = poly8 / minipoly[poly8] // Factor
(-9 + x) (-7 + x)^7 (5 + x)^24 (59 - 16 x + x^2)

feasiblesubcharpolylist[(-11 + x) (-9 + x)^2 (-8 + x) (-7 + x)^8 (5 + x)^25 (59 - 16 x + x^2)^2]
{(-11 + x) (-9 + x) (-7 + x) (-3 + x) (59 - 16 x + x^2),
 (-11 + x) (-9 + x) (-7 + x) (-169 + 107 x - 19 x^2 + x^3),
 (-9 + x) (59 - 16 x + x^2) (-223 + 131 x - 21 x^2 + x^3),
 (-11 + x) (-9 + x) (-7 + x)^2 (23 - 12 x + x^2),
 (-9 + x) (-12541 + 11153 x - 3550 x^2 + 526 x^3 - 37 x^4 + x^5),
 (-11 + x) (-9 + x)^2 (-7 + x) (17 - 10 x + x^2),
 (-9 + x) (-7 + x) (1699 - 1330 x + 316 x^2 - 30 x^3 + x^4)}
```

```
{(-11 + x) (-9 + x) (-7 + x) (-3 + x) (59 - 16 x + x^2),
  (-11 + x) (-9 + x) (-7 + x) (-169 + 107 x - 19 x^2 + x^3),
  (-9 + x) (59 - 16 x + x^2) (-223 + 131 x - 21 x^2 + x^3),
  (-11 + x) (-9 + x) (-7 + x)^2 (23 - 12 x + x^2),
  (-9 + x) (-12 541 + 11 153 x - 3550 x^2 + 526 x^3 - 37 x^4 + x^5),
  (-11 + x) (-9 + x)^2 (-7 + x) (17 - 10 x + x^2),
  (-9 + x) (-7 + x) (1699 - 1330 x + 316 x^2 - 30 x^3 + x^4)} // Length
```

```
7
```

```
CoefficientList[{(-11 + x) (-9 + x) (-7 + x) (-3 + x) (59 - 16 x + x^2),
  (-11 + x) (-9 + x) (-7 + x) (-169 + 107 x - 19 x^2 + x^3),
  (-9 + x) (59 - 16 x + x^2) (-223 + 131 x - 21 x^2 + x^3),
  (-11 + x) (-9 + x) (-7 + x)^2 (23 - 12 x + x^2),
  (-9 + x) (-12 541 + 11 153 x - 3550 x^2 + 526 x^3 - 37 x^4 + x^5),
  (-11 + x) (-9 + x)^2 (-7 + x) (17 - 10 x + x^2),
  (-9 + x) (-7 + x) (1699 - 1330 x + 316 x^2 - 30 x^3 + x^4)}, x]
```

```
{{122 661, -116 454, 43 519, -8300, 859, -46, 1},
 {117 117, -114 542, 43 303, -8292, 859, -46, 1},
 {118 413, -114 830, 43 319, -8292, 859, -46, 1},
 {111 573, -112 630, 43 087, -8284, 859, -46, 1},
 {112 869, -112 918, 43 103, -8284, 859, -46, 1},
 {106 029, -110 718, 42 871, -8276, 859, -46, 1},
 {107 037, -110 974, 42 887, -8276, 859, -46, 1}}
```

```
A = {{122 661, -116 454, 43 519, -8300, 859, -46, 1},
   {117 117, -114 542, 43 303, -8292, 859, -46, 1}, {118 413, -114 830, 43 319,
    -8292, 859, -46, 1}, {111 573, -112 630, 43 087, -8284, 859, -46, 1},
   {112 869, -112 918, 43 103, -8284, 859, -46, 1}, {106 029, -110 718, 42 871,
    -8276, 859, -46, 1}, {107 037, -110 974, 42 887, -8276, 859, -46, 1}};
```

```
MatrixRank[A]
```

```
4
```

```
CoefficientList[D[poly8, x] / p8 // Factor, x]
```

```
{4 704 685, -4 657 158, 1 770 487, -339 772, 35 219, -1886, 41}
```

```
Solve[
 Array[n, 7].{{122 661, -116 454, 43 519, -8300, 859, -46, 1}, {117 117, -114 542,
     43 303, -8292, 859, -46, 1}, {118 413, -114 830, 43 319, -8292, 859, -46, 1},
    {111 573, -112 630, 43 087, -8284, 859, -46, 1}, {112 869, -112 918, 43 103,
     -8284, 859, -46, 1}, {106 029, -110 718, 42 871, -8276, 859, -46, 1},
    {107 037, -110 974, 42 887, -8276, 859, -46, 1}} ==
  {4 704 685, -4 657 158, 1 770 487, -339 772, 35 219, -1886, 41}, Array[n, 7]]
```

```
{}
```

```
Array[m, 7].Transpose[A]
```

```
{122 661 m[1] - 116 454 m[2] + 43 519 m[3] - 8300 m[4] + 859 m[5] - 46 m[6] + m[7],
 117 117 m[1] - 114 542 m[2] + 43 303 m[3] - 8292 m[4] + 859 m[5] - 46 m[6] + m[7],
 118 413 m[1] - 114 830 m[2] + 43 319 m[3] - 8292 m[4] + 859 m[5] - 46 m[6] + m[7],
 111 573 m[1] - 112 630 m[2] + 43 087 m[3] - 8284 m[4] + 859 m[5] - 46 m[6] + m[7],
 112 869 m[1] - 112 918 m[2] + 43 103 m[3] - 8284 m[4] + 859 m[5] - 46 m[6] + m[7],
 106 029 m[1] - 110 718 m[2] + 42 871 m[3] - 8276 m[4] + 859 m[5] - 46 m[6] + m[7],
 107 037 m[1] - 110 974 m[2] + 42 887 m[3] - 8276 m[4] + 859 m[5] - 46 m[6] + m[7]}
```

```
Array[m, 7].{4 704 685, -4 657 158, 1 770 487, -339 772, 35 219, -1886, 41}
```

```
4 704 685 m[1] - 4 657 158 m[2] + 1 770 487 m[3] -
 339 772 m[4] + 35 219 m[5] - 1886 m[6] + 41 m[7]
```

```
FindInstance[
 122 661 m[1] - 116 454 m[2] + 43 519 m[3] - 8300 m[4] + 859 m[5] - 46 m[6] + m[7] ≥ 0 &&
  117 117 m[1] - 114 542 m[2] + 43 303 m[3] - 8292 m[4] + 859 m[5] - 46 m[6] + m[7] ≥ 0 &&
  118 413 m[1] - 114 830 m[2] + 43 319 m[3] - 8292 m[4] + 859 m[5] - 46 m[6] + m[7] ≥ 0 &&
  111 573 m[1] - 112 630 m[2] + 43 087 m[3] - 8284 m[4] + 859 m[5] - 46 m[6] + m[7] ≥ 0 &&
  112 869 m[1] - 112 918 m[2] + 43 103 m[3] - 8284 m[4] + 859 m[5] - 46 m[6] + m[7] ≥ 0 &&
  106 029 m[1] - 110 718 m[2] + 42 871 m[3] - 8276 m[4] + 859 m[5] - 46 m[6] + m[7] ≥ 0 &&
  107 037 m[1] - 110 974 m[2] + 42 887 m[3] - 8276 m[4] + 859 m[5] - 46 m[6] + m[7] ≥ 0 &&
  4 704 685 m[1] - 4 657 158 m[2] + 1 770 487 m[3] - 339 772 m[4] +
    35 219 m[5] - 1886 m[6] + 41 m[7] < 0, Array[m, 7], Integers]
```

```
{{m[1] → -8185, m[2] → -53 247,
  m[3] → -295 413, m[4] → -922 821, m[5] → 0, m[6] → 0, m[7] → 0}}
```

```
Array[m, 7] /. {m[1] → -8185, m[2] → -53 247,
  m[3] → -295 413, m[4] → -922 821, m[5] → 0, m[6] → 0, m[7] → 0}
```

```
{-8185, -53 247, -295 413, -922 821, 0, 0, 0}
```

```
GCD[-8185, -53 247, -295 413, -922 821, 0, 0, 0]
```

```
1
```

```
A.{-8185, -53 247, -295 413, -922 821, 0, 0, 0}
```

```
{181 806, 177 822, 178 590, 173 838, 174 606, 169 854, 823 998}
```

```
{-8185, -53 247, -295 413, -922 821, 0, 0, 0}.Transpose[A]
```

```
{181 806, 177 822, 178 590, 173 838, 174 606, 169 854, 823 998}
```

```
{-8185, -53 247, -295 413, -922 821, 0, 0, 0}.
 {4 704 685, -4 657 158, 1 770 487, -339 772, 35 219, -1886, 41}
```

```
-4 294 018
```

```
poly9 = listmod128[[9]]
```

$$(-9+x)^5\,(-7+x)^8\,(5+x)^{25}\,\left(-412+179\,x-24\,x^2+x^3\right)$$

```
p9 = poly9 / minipoly[poly9] // Factor
```

$$(-9+x)^4\,(-7+x)^7\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-9 + x)^5 (-7 + x)^8 (5 + x)^25 (-412 + 179 x - 24 x^2 + x^3)]
```

$$\{(-7+x)\left(1361-1044\,x+270\,x^2-28\,x^3+x^4\right),\ (-7+x)\left(1273-1036\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-5+x)\left(1811-1346\,x+316\,x^2-30\,x^3+x^4\right),\ (-7+x)\left(1289-1036\,x+270\,x^2-28\,x^3+x^4\right),$$
$$-9167+8557\,x-2926\,x^2+466\,x^3-35\,x^4+x^5,\ (-9+x)(-7+x)(-5+x)\left(29-14\,x+x^2\right),$$
$$(-7+x)\left(1185-1028\,x+270\,x^2-28\,x^3+x^4\right),\ (-7+x)\left(1201-1028\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-7+x)\left(1217-1028\,x+270\,x^2-28\,x^3+x^4\right),\ -8663+8429\,x-2918\,x^2+466\,x^3-35\,x^4+x^5,$$
$$(-9+x)(-7+x)\left(-137+99\,x-19\,x^2+x^3\right),\ (-9+x)(-5+x)\left(-195+127\,x-21\,x^2+x^3\right),$$
$$(-7+x)\left(1129-1020\,x+270\,x^2-28\,x^3+x^4\right),\ (-7+x)\left(1145-1020\,x+270\,x^2-28\,x^3+x^4\right),$$
$$-8159+8301\,x-2910\,x^2+466\,x^3-35\,x^4+x^5,\ (-9+x)(-7+x)\left(-129+99\,x-19\,x^2+x^3\right),$$
$$(-9+x)\left(919-822\,x+232\,x^2-26\,x^3+x^4\right),\ (-7+x)^2\left(-151+123\,x-21\,x^2+x^3\right),$$
$$(-7+x)\left(1073-1012\,x+270\,x^2-28\,x^3+x^4\right),\ (-11+x)(-9+x)(-7+x)\left(11-8\,x+x^2\right),$$
$$(-9+x)\left(863-814\,x+232\,x^2-26\,x^3+x^4\right),\ (-11+x)(-7+x)^2\left(13-10\,x+x^2\right),$$
$$(-9+x)(-7+x)\left(-113+99\,x-19\,x^2+x^3\right),\ (-7+x)\left(929-996\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)(-7+x)^2\left(15-12\,x+x^2\right),\ (-9+x)(-7+x)\left(-97+99\,x-19\,x^2+x^3\right)\}$$

```
{(-7 + x) (1361 - 1044 x + 270 x^2 - 28 x^3 + x^4), (-7 + x) (1273 - 1036 x + 270 x^2 - 28 x^3 + x^4),
  (-5 + x) (1811 - 1346 x + 316 x^2 - 30 x^3 + x^4), (-7 + x) (1289 - 1036 x + 270 x^2 - 28 x^3 + x^4),
  -9167 + 8557 x - 2926 x^2 + 466 x^3 - 35 x^4 + x^5, (-9 + x) (-7 + x) (-5 + x) (29 - 14 x + x^2),
  (-7 + x) (1185 - 1028 x + 270 x^2 - 28 x^3 + x^4), (-7 + x) (1201 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-7 + x) (1217 - 1028 x + 270 x^2 - 28 x^3 + x^4), -8663 + 8429 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5,
  (-9 + x) (-7 + x) (-137 + 99 x - 19 x^2 + x^3), (-9 + x) (-5 + x) (-195 + 127 x - 21 x^2 + x^3),
  (-7 + x) (1129 - 1020 x + 270 x^2 - 28 x^3 + x^4), (-7 + x) (1145 - 1020 x + 270 x^2 - 28 x^3 + x^4),
  -8159 + 8301 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5, (-9 + x) (-7 + x) (-129 + 99 x - 19 x^2 + x^3),
  (-9 + x) (919 - 822 x + 232 x^2 - 26 x^3 + x^4), (-7 + x)^2 (-151 + 123 x - 21 x^2 + x^3),
  (-7 + x) (1073 - 1012 x + 270 x^2 - 28 x^3 + x^4), (-11 + x) (-9 + x) (-7 + x) (11 - 8 x + x^2),
  (-9 + x) (863 - 814 x + 232 x^2 - 26 x^3 + x^4), (-11 + x) (-7 + x)^2 (13 - 10 x + x^2),
  (-9 + x) (-7 + x) (-113 + 99 x - 19 x^2 + x^3), (-7 + x) (929 - 996 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (15 - 12 x + x^2), (-9 + x) (-7 + x) (-97 + 99 x - 19 x^2 + x^3)} // Length
```

26

```
CoefficientList[
 {(-7 + x) (1361 - 1044 x + 270 x^2 - 28 x^3 + x^4), (-7 + x) (1273 - 1036 x + 270 x^2 - 28 x^3 + x^4),
  (-5 + x) (1811 - 1346 x + 316 x^2 - 30 x^3 + x^4), (-7 + x) (1289 - 1036 x + 270 x^2 - 28 x^3 + x^4),
  -9167 + 8557 x - 2926 x^2 + 466 x^3 - 35 x^4 + x^5, (-9 + x) (-7 + x) (-5 + x) (29 - 14 x + x^2),
  (-7 + x) (1185 - 1028 x + 270 x^2 - 28 x^3 + x^4), (-7 + x) (1201 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-7 + x) (1217 - 1028 x + 270 x^2 - 28 x^3 + x^4), -8663 + 8429 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5,
  (-9 + x) (-7 + x) (-137 + 99 x - 19 x^2 + x^3), (-9 + x) (-5 + x) (-195 + 127 x - 21 x^2 + x^3),
  (-7 + x) (1129 - 1020 x + 270 x^2 - 28 x^3 + x^4), (-7 + x) (1145 - 1020 x + 270 x^2 - 28 x^3 + x^4),
  -8159 + 8301 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5, (-9 + x) (-7 + x) (-129 + 99 x - 19 x^2 + x^3),
  (-9 + x) (919 - 822 x + 232 x^2 - 26 x^3 + x^4), (-7 + x)^2 (-151 + 123 x - 21 x^2 + x^3),
  (-7 + x) (1073 - 1012 x + 270 x^2 - 28 x^3 + x^4), (-11 + x) (-9 + x) (-7 + x) (11 - 8 x + x^2),
  (-9 + x) (863 - 814 x + 232 x^2 - 26 x^3 + x^4), (-11 + x) (-7 + x)^2 (13 - 10 x + x^2),
  (-9 + x) (-7 + x) (-113 + 99 x - 19 x^2 + x^3), (-7 + x) (929 - 996 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (15 - 12 x + x^2), (-9 + x) (-7 + x) (-97 + 99 x - 19 x^2 + x^3)}, x]
```

```
{{-9527, 8669, -2934, 466, -35, 1}, {-8911, 8525, -2926, 466, -35, 1},
 {-9055, 8541, -2926, 466, -35, 1}, {-9023, 8541, -2926, 466, -35, 1},
 {-9167, 8557, -2926, 466, -35, 1}, {-9135, 8557, -2926, 466, -35, 1},
 {-8295, 8381, -2918, 466, -35, 1}, {-8407, 8397, -2918, 466, -35, 1},
 {-8519, 8413, -2918, 466, -35, 1}, {-8663, 8429, -2918, 466, -35, 1},
 {-8631, 8429, -2918, 466, -35, 1}, {-8775, 8445, -2918, 466, -35, 1},
 {-7903, 8269, -2910, 466, -35, 1}, {-8015, 8285, -2910, 466, -35, 1},
 {-8159, 8301, -2910, 466, -35, 1}, {-8127, 8301, -2910, 466, -35, 1},
 {-8271, 8317, -2910, 466, -35, 1}, {-7399, 8141, -2902, 466, -35, 1},
 {-7511, 8157, -2902, 466, -35, 1}, {-7623, 8173, -2902, 466, -35, 1},
 {-7767, 8189, -2902, 466, -35, 1}, {-7007, 8029, -2894, 466, -35, 1},
 {-7119, 8045, -2894, 466, -35, 1}, {-6503, 7901, -2886, 466, -35, 1},
 {-6615, 7917, -2886, 466, -35, 1}, {-6111, 7789, -2878, 466, -35, 1}}
```

```
A = {{-9527, 8669, -2934, 466, -35, 1}, {-8911, 8525, -2926, 466, -35, 1},
   {-9055, 8541, -2926, 466, -35, 1}, {-9023, 8541, -2926, 466, -35, 1},
   {-9167, 8557, -2926, 466, -35, 1}, {-9135, 8557, -2926, 466, -35, 1},
   {-8295, 8381, -2918, 466, -35, 1}, {-8407, 8397, -2918, 466, -35, 1},
   {-8519, 8413, -2918, 466, -35, 1}, {-8663, 8429, -2918, 466, -35, 1},
   {-8631, 8429, -2918, 466, -35, 1}, {-8775, 8445, -2918, 466, -35, 1},
   {-7903, 8269, -2910, 466, -35, 1}, {-8015, 8285, -2910, 466, -35, 1},
   {-8159, 8301, -2910, 466, -35, 1}, {-8127, 8301, -2910, 466, -35, 1},
   {-8271, 8317, -2910, 466, -35, 1}, {-7399, 8141, -2902, 466, -35, 1},
   {-7511, 8157, -2902, 466, -35, 1}, {-7623, 8173, -2902, 466, -35, 1},
   {-7767, 8189, -2902, 466, -35, 1}, {-7007, 8029, -2894, 466, -35, 1},
   {-7119, 8045, -2894, 466, -35, 1}, {-6503, 7901, -2886, 466, -35, 1},
   {-6615, 7917, -2886, 466, -35, 1}, {-6111, 7789, -2878, 466, -35, 1}};
```

```
CoefficientList[D[poly9, x] / p9 // Factor, x]
```

```
{-372 095, 350 101, -119 942, 19 106, -1435, 41}
```

```
Solve[Array[n, 26].
    {{-9527, 8669, -2934, 466, -35, 1}, {-8911, 8525, -2926, 466, -35, 1},
     {-9055, 8541, -2926, 466, -35, 1}, {-9023, 8541, -2926, 466, -35, 1},
     {-9167, 8557, -2926, 466, -35, 1}, {-9135, 8557, -2926, 466, -35, 1},
     {-8295, 8381, -2918, 466, -35, 1}, {-8407, 8397, -2918, 466, -35, 1},
     {-8519, 8413, -2918, 466, -35, 1}, {-8663, 8429, -2918, 466, -35, 1},
     {-8631, 8429, -2918, 466, -35, 1}, {-8775, 8445, -2918, 466, -35, 1},
     {-7903, 8269, -2910, 466, -35, 1}, {-8015, 8285, -2910, 466, -35, 1},
     {-8159, 8301, -2910, 466, -35, 1}, {-8127, 8301, -2910, 466, -35, 1},
     {-8271, 8317, -2910, 466, -35, 1}, {-7399, 8141, -2902, 466, -35, 1},
     {-7511, 8157, -2902, 466, -35, 1}, {-7623, 8173, -2902, 466, -35, 1},
     {-7767, 8189, -2902, 466, -35, 1}, {-7007, 8029, -2894, 466, -35, 1},
     {-7119, 8045, -2894, 466, -35, 1}, {-6503, 7901, -2886, 466, -35, 1},
     {-6615, 7917, -2886, 466, -35, 1}, {-6111, 7789, -2878, 466, -35, 1}} ==
   {-372 095, 350 101, -119 942, 19 106, -1435, 41}, Array[n, 26]]
```

Solve::svars : Equations may not give solutions for all "solve" variables. ≫

```
{{n[21] → 48 - n[3] - n[5] - n[10] - n[12] - n[15] - n[17],
  n[24] → 70 - n[1] - 2 n[2] - 2 n[3] - n[4] - n[5] - 3 n[7] - 2 n[8] -
    n[9] - n[10] - 2 n[13] - n[14] - n[15] - 2 n[18] - n[19] - n[22],
  n[25] → 29 - 6 n[1] - 4 n[2] - n[3] - 5 n[4] - 2 n[5] - 6 n[6] - 2 n[7] -
    3 n[8] - 4 n[9] - n[10] - 5 n[11] - 2 n[12] - 2 n[13] - 3 n[14] -
    4 n[16] - n[17] - n[18] - 2 n[19] - 3 n[20] - n[22] - 2 n[23],
  n[26] → -106 + 6 n[1] + 5 n[2] + 3 n[3] + 5 n[4] + 3 n[5] + 5 n[6] + 4 n[7] +
    4 n[8] + 4 n[9] + 2 n[10] + 4 n[11] + 2 n[12] + 3 n[13] + 3 n[14] +
    n[15] + 3 n[16] + n[17] + 2 n[18] + 2 n[19] + 2 n[20] + n[22] + n[23]}}
```

```
FindInstance[-n[21] + 48 - n[3] - n[5] - n[10] - n[12] - n[15] - n[17] == 0 &&
  -n[24] + 70 - n[1] - 2 n[2] - 2 n[3] - n[4] - n[5] - 3 n[7] - 2 n[8] -
    n[9] - n[10] - 2 n[13] - n[14] - n[15] - 2 n[18] - n[19] - n[22] == 0 &&
  -n[25] + 29 - 6 n[1] - 4 n[2] - n[3] - 5 n[4] - 2 n[5] - 6 n[6] -
    2 n[7] - 3 n[8] - 4 n[9] - n[10] - 5 n[11] - 2 n[12] - 2 n[13] - 3 n[14] -
    4 n[16] - n[17] - n[18] - 2 n[19] - 3 n[20] - n[22] - 2 n[23] == 0 &&
  -n[26] - 106 + 6 n[1] + 5 n[2] + 3 n[3] + 5 n[4] + 3 n[5] + 5 n[6] + 4 n[7] +
    4 n[8] + 4 n[9] + 2 n[10] + 4 n[11] + 2 n[12] + 3 n[13] + 3 n[14] + n[15] +
    3 n[16] + n[17] + 2 n[18] + 2 n[19] + 2 n[20] + n[22] + n[23] == 0
  && n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 && n[7] ≥ 0 &&
  n[8] ≥ 0 && n[9] ≥ 0 && n[10] ≥ 0 && n[11] ≥ 0 && n[12] ≥ 0 && n[13] ≥ 0 && n[14] ≥ 0 &&
  n[15] ≥ 0 && n[16] ≥ 0 && n[17] ≥ 0 && n[18] ≥ 0 && n[19] ≥ 0 && n[20] ≥ 0 && n[21] ≥ 0 &&
  n[22] ≥ 0 && n[23] ≥ 0 && n[24] ≥ 0 && n[25] ≥ 0 && n[26] ≥ 0, Array[n, 26], Integers]
```

```
{}
```

```
Array[m, 6].Transpose[A]
```

```
{-9527 m[1] + 8669 m[2] - 2934 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8911 m[1] + 8525 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6],
 -9055 m[1] + 8541 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6],
 -9023 m[1] + 8541 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6],
 -9167 m[1] + 8557 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6],
 -9135 m[1] + 8557 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8295 m[1] + 8381 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8407 m[1] + 8397 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8519 m[1] + 8413 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8663 m[1] + 8429 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8631 m[1] + 8429 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8775 m[1] + 8445 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6],
 -7903 m[1] + 8269 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8015 m[1] + 8285 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8159 m[1] + 8301 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8127 m[1] + 8301 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6],
 -8271 m[1] + 8317 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6],
 -7399 m[1] + 8141 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6],
 -7511 m[1] + 8157 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6],
 -7623 m[1] + 8173 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6],
 -7767 m[1] + 8189 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6],
 -7007 m[1] + 8029 m[2] - 2894 m[3] + 466 m[4] - 35 m[5] + m[6],
 -7119 m[1] + 8045 m[2] - 2894 m[3] + 466 m[4] - 35 m[5] + m[6],
 -6503 m[1] + 7901 m[2] - 2886 m[3] + 466 m[4] - 35 m[5] + m[6],
 -6615 m[1] + 7917 m[2] - 2886 m[3] + 466 m[4] - 35 m[5] + m[6],
 -6111 m[1] + 7789 m[2] - 2878 m[3] + 466 m[4] - 35 m[5] + m[6]}
```

```
Array[m, 6].{-372 095, 350 101, -119 942, 19 106, -1435, 41}
```

```
-372 095 m[1] + 350 101 m[2] - 119 942 m[3] + 19 106 m[4] - 1435 m[5] + 41 m[6]
```

```
FindInstance[-9527 m[1] + 8669 m[2] - 2934 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8911 m[1] + 8525 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9055 m[1] + 8541 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9023 m[1] + 8541 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9167 m[1] + 8557 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9135 m[1] + 8557 m[2] - 2926 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8295 m[1] + 8381 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8407 m[1] + 8397 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8519 m[1] + 8413 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8663 m[1] + 8429 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8631 m[1] + 8429 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8775 m[1] + 8445 m[2] - 2918 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7903 m[1] + 8269 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8015 m[1] + 8285 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8159 m[1] + 8301 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8127 m[1] + 8301 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8271 m[1] + 8317 m[2] - 2910 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7399 m[1] + 8141 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7511 m[1] + 8157 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7623 m[1] + 8173 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7767 m[1] + 8189 m[2] - 2902 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7007 m[1] + 8029 m[2] - 2894 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7119 m[1] + 8045 m[2] - 2894 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -6503 m[1] + 7901 m[2] - 2886 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -6615 m[1] + 7917 m[2] - 2886 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -6111 m[1] + 7789 m[2] - 2878 m[3] + 466 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -372 095 m[1] + 350 101 m[2] - 119 942 m[3] + 19 106 m[4] - 1435 m[5] + 41 m[6] < 0,
 Array[m, 6], Integers]
```

```
{{m[1] → 3851, m[2] → 26 961, m[3] → 188 720, m[4] → 0, m[5] → 0, m[6] → 356 804 550}}
```

```
Array[m, 6] /.
 {m[1] → 3851, m[2] → 26 961, m[3] → 188 720, m[4] → 0, m[5] → 0, m[6] → 356 804 550}
```

```
{3851, 26 961, 188 720, 0, 0, 356 804 550}
```

```
GCD[3851, 26 961, 188 720, 0, 0, 356 804 550]
```

```
1
```

```
{{-9527, 8669, -2934, 466, -35, 1},
  {-8911, 8525, -2926, 466, -35, 1}, {-9055, 8541, -2926, 466, -35, 1},
  {-9023, 8541, -2926, 466, -35, 1}, {-9167, 8557, -2926, 466, -35, 1},
  {-9135, 8557, -2926, 466, -35, 1}, {-8295, 8381, -2918, 466, -35, 1},
  {-8407, 8397, -2918, 466, -35, 1}, {-8519, 8413, -2918, 466, -35, 1},
  {-8663, 8429, -2918, 466, -35, 1}, {-8631, 8429, -2918, 466, -35, 1},
  {-8775, 8445, -2918, 466, -35, 1}, {-7903, 8269, -2910, 466, -35, 1},
  {-8015, 8285, -2910, 466, -35, 1}, {-8159, 8301, -2910, 466, -35, 1},
  {-8127, 8301, -2910, 466, -35, 1}, {-8271, 8317, -2910, 466, -35, 1},
  {-7399, 8141, -2902, 466, -35, 1}, {-7511, 8157, -2902, 466, -35, 1},
  {-7623, 8173, -2902, 466, -35, 1}, {-7767, 8189, -2902, 466, -35, 1},
  {-7007, 8029, -2894, 466, -35, 1}, {-7119, 8045, -2894, 466, -35, 1},
  {-6503, 7901, -2886, 466, -35, 1}, {-6615, 7917, -2886, 466, -35, 1},
  {-6111, 7789, -2878, 466, -35, 1}} // MatrixForm
```

$$\begin{pmatrix} -9527 & 8669 & -2934 & 466 & -35 & 1 \\ -8911 & 8525 & -2926 & 466 & -35 & 1 \\ -9055 & 8541 & -2926 & 466 & -35 & 1 \\ -9023 & 8541 & -2926 & 466 & -35 & 1 \\ -9167 & 8557 & -2926 & 466 & -35 & 1 \\ -9135 & 8557 & -2926 & 466 & -35 & 1 \\ -8295 & 8381 & -2918 & 466 & -35 & 1 \\ -8407 & 8397 & -2918 & 466 & -35 & 1 \\ -8519 & 8413 & -2918 & 466 & -35 & 1 \\ -8663 & 8429 & -2918 & 466 & -35 & 1 \\ -8631 & 8429 & -2918 & 466 & -35 & 1 \\ -8775 & 8445 & -2918 & 466 & -35 & 1 \\ -7903 & 8269 & -2910 & 466 & -35 & 1 \\ -8015 & 8285 & -2910 & 466 & -35 & 1 \\ -8159 & 8301 & -2910 & 466 & -35 & 1 \\ -8127 & 8301 & -2910 & 466 & -35 & 1 \\ -8271 & 8317 & -2910 & 466 & -35 & 1 \\ -7399 & 8141 & -2902 & 466 & -35 & 1 \\ -7511 & 8157 & -2902 & 466 & -35 & 1 \\ -7623 & 8173 & -2902 & 466 & -35 & 1 \\ -7767 & 8189 & -2902 & 466 & -35 & 1 \\ -7007 & 8029 & -2894 & 466 & -35 & 1 \\ -7119 & 8045 & -2894 & 466 & -35 & 1 \\ -6503 & 7901 & -2886 & 466 & -35 & 1 \\ -6615 & 7917 & -2886 & 466 & -35 & 1 \\ -6111 & 7789 & -2878 & 466 & -35 & 1 \end{pmatrix}$$

```
{3851, 26 961, 188 720, 0, 0, 356 804 550}.
 {-372 095, 350 101, -119 942, 19 106, -1435, 41}
```

$$-332\,474$$

$$\{3851, 26961, 188720, 0, 0, 356804550\}.\text{Transpose}\left[\begin{pmatrix} -9527 & 8669 & -2934 & 466 & -35 & 1 \\ -8911 & 8525 & -2926 & 466 & -35 & 1 \\ -9055 & 8541 & -2926 & 466 & -35 & 1 \\ -9023 & 8541 & -2926 & 466 & -35 & 1 \\ -9167 & 8557 & -2926 & 466 & -35 & 1 \\ -9135 & 8557 & -2926 & 466 & -35 & 1 \\ -8295 & 8381 & -2918 & 466 & -35 & 1 \\ -8407 & 8397 & -2918 & 466 & -35 & 1 \\ -8519 & 8413 & -2918 & 466 & -35 & 1 \\ -8663 & 8429 & -2918 & 466 & -35 & 1 \\ -8631 & 8429 & -2918 & 466 & -35 & 1 \\ -8775 & 8445 & -2918 & 466 & -35 & 1 \\ -7903 & 8269 & -2910 & 466 & -35 & 1 \\ -8015 & 8285 & -2910 & 466 & -35 & 1 \\ -8159 & 8301 & -2910 & 466 & -35 & 1 \\ -8127 & 8301 & -2910 & 466 & -35 & 1 \\ -8271 & 8317 & -2910 & 466 & -35 & 1 \\ -7399 & 8141 & -2902 & 466 & -35 & 1 \\ -7511 & 8157 & -2902 & 466 & -35 & 1 \\ -7623 & 8173 & -2902 & 466 & -35 & 1 \\ -7767 & 8189 & -2902 & 466 & -35 & 1 \\ -7007 & 8029 & -2894 & 466 & -35 & 1 \\ -7119 & 8045 & -2894 & 466 & -35 & 1 \\ -6503 & 7901 & -2886 & 466 & -35 & 1 \\ -6615 & 7917 & -2886 & 466 & -35 & 1 \\ -6111 & 7789 & -2878 & 466 & -35 & 1 \end{pmatrix}\right]$$

$$\{136502, 136094, 12926, 136158, 12990, 136222, 135686, 135750, 135814, 12646, 135878, 12710, 135406, 135470, 12302, 135534, 12366, 135062, 135126, 135190, 12022, 134782, 134846, 134438, 134502, 134158\}$$

```
poly10 = listmod128[[10]]
```

$$(-11+x)\,(-9+x)^4\,(-7+x)^8\,(-5+x)\,(5+x)^{25}\left(68-17x+x^2\right)$$

```
p10 = poly10 / minipoly[poly10] // Factor
```

$$(-9+x)^3\,(-7+x)^7\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-11 + x) (-9 + x)^4 (-7 + x)^8 (-5 + x) (5 + x)^25 (68 - 17 x + x^2)]
```

```
{(-11 + x) (-7 + x) (1059 - 870 x + 236 x^2 - 26 x^3 + x^4),
 (-11 + x) (-7 + x) (-5 + x) (-215 + 131 x - 21 x^2 + x^3),
 (-11 + x) (-7 + x) (59 - 16 x + x^2) (17 - 10 x + x^2),
 (-11 + x) (-7 + x) (1019 - 862 x + 236 x^2 - 26 x^3 + x^4),
 (-11 + x) (-9 + x) (-7 + x) (-5 + x) (23 - 12 x + x^2),
 (-9 + x) (-8823 + 8461 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-11 + x) (-7 + x) (947 - 854 x + 236 x^2 - 26 x^3 + x^4),
 (-11 + x) (-9 + x) (-7 + x) (-107 + 83 x - 17 x^2 + x^3),
 (-7 + x) (59 - 16 x + x^2) (-179 + 127 x - 21 x^2 + x^3),
 (-9 + x) (-7 + x) (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4),
 (-11 + x) (-9 + x)^2 (-7 + x) (11 - 8 x + x^2),
 (-9 + x) (-7 + x) (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4)}
```

```
{(-11 + x) (-7 + x) (1059 - 870 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-7 + x) (-5 + x) (-215 + 131 x - 21 x^2 + x^3),
  (-11 + x) (-7 + x) (59 - 16 x + x^2) (17 - 10 x + x^2),
  (-11 + x) (-7 + x) (1019 - 862 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x) (-5 + x) (23 - 12 x + x^2),
  (-9 + x) (-8823 + 8461 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-11 + x) (-7 + x) (947 - 854 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x) (-107 + 83 x - 17 x^2 + x^3),
  (-7 + x) (59 - 16 x + x^2) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x) (-7 + x) (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4),
  (-11 + x) (-9 + x)^2 (-7 + x) (11 - 8 x + x^2),
  (-9 + x) (-7 + x) (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4)} // Length
```

```
12
```

```
CoefficientList[{(-11 + x) (-7 + x) (1059 - 870 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-7 + x) (-5 + x) (-215 + 131 x - 21 x^2 + x^3),
  (-11 + x) (-7 + x) (59 - 16 x + x^2) (17 - 10 x + x^2),
  (-11 + x) (-7 + x) (1019 - 862 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x) (-5 + x) (23 - 12 x + x^2),
  (-9 + x) (-8823 + 8461 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-11 + x) (-7 + x) (947 - 854 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x) (-107 + 83 x - 17 x^2 + x^3),
  (-7 + x) (59 - 16 x + x^2) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x) (-7 + x) (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4),
  (-11 + x) (-9 + x)^2 (-7 + x) (11 - 8 x + x^2),
  (-9 + x) (-7 + x) (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4)}, x]
```

```
{{81543, -86052, 34891, -7120, 781, -44, 1},
 {82775, -86340, 34907, -7120, 781, -44, 1},
 {77231, -84428, 34691, -7112, 781, -44, 1},
 {78463, -84716, 34707, -7112, 781, -44, 1},
 {79695, -85004, 34723, -7112, 781, -44, 1},
 {79407, -84972, 34723, -7112, 781, -44, 1},
 {72919, -82804, 34491, -7104, 781, -44, 1},
 {74151, -83092, 34507, -7104, 781, -44, 1},
 {73927, -83060, 34507, -7104, 781, -44, 1},
 {75159, -83348, 34523, -7104, 781, -44, 1},
 {68607, -81180, 34291, -7096, 781, -44, 1},
 {69615, -81436, 34307, -7096, 781, -44, 1}}
```

```
A = {{81543, -86052, 34891, -7120, 781, -44, 1},
   {82775, -86340, 34907, -7120, 781, -44, 1},
   {77231, -84428, 34691, -7112, 781, -44, 1}, {78463, -84716, 34707,
    -7112, 781, -44, 1}, {79695, -85004, 34723, -7112, 781, -44, 1},
   {79407, -84972, 34723, -7112, 781, -44, 1}, {72919, -82804, 34491,
    -7104, 781, -44, 1}, {74151, -83092, 34507, -7104, 781, -44, 1},
   {73927, -83060, 34507, -7104, 781, -44, 1}, {75159, -83348, 34523,
    -7104, 781, -44, 1}, {68607, -81180, 34291, -7096, 781, -44, 1},
   {69615, -81436, 34307, -7096, 781, -44, 1}};
```

```
CoefficientList[D[poly10, x] / p10 // Factor, x]
```

```
{3383255, -3537084, 1430763, -291896, 32021, -1804, 41}
```

```
Solve[
 Array[n, 12].{{81543, -86052, 34891, -7120, 781, -44, 1}, {82775, -86340, 34907,
     -7120, 781, -44, 1}, {77231, -84428, 34691, -7112, 781, -44, 1},
    {78463, -84716, 34707, -7112, 781, -44, 1}, {79695, -85004, 34723,
     -7112, 781, -44, 1}, {79407, -84972, 34723, -7112, 781, -44, 1},
    {72919, -82804, 34491, -7104, 781, -44, 1}, {74151, -83092, 34507,
     -7104, 781, -44, 1}, {73927, -83060, 34507, -7104, 781, -44, 1},
    {75159, -83348, 34523, -7104, 781, -44, 1}, {68607, -81180, 34291,
     -7096, 781, -44, 1}, {69615, -81436, 34307, -7096, 781, -44, 1}} ==
  {3383255, -3537084, 1430763, -291896, 32021, -1804, 41}, Array[n, 12]]
```

Solve::svars : Equations may not give solutions for all "solve" variables. ≫

```
{{n[6] → 48, n[9] → 56 - 3 n[1] - 2 n[2] - 2 n[3] - n[4] - n[7],
  n[10] → -32 - n[2] - n[4] - 2 n[5] - n[8],
  n[11] → 5 - n[1] - n[2] - n[3] - n[4] - n[5] - n[7] - n[8],
  n[12] → -36 + 3 n[1] + 3 n[2] + 2 n[3] + 2 n[4] + 2 n[5] + n[7] + n[8]}}
```

```
FindInstance[-n[6] + 48 == 0 && -n[9] + 56 - 3 n[1] - 2 n[2] - 2 n[3] - n[4] - n[7] == 0 &&
  -n[10] - 32 - n[2] - n[4] - 2 n[5] - n[8] == 0 &&
  -n[11] + 5 - n[1] - n[2] - n[3] - n[4] - n[5] - n[7] - n[8] == 0 &&
  -n[12] - 36 + 3 n[1] + 3 n[2] + 2 n[3] + 2 n[4] + 2 n[5] + n[7] + n[8] == 0 && n[1] ≥ 0 &&
  n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 && n[7] ≥ 0 && n[8] ≥ 0 &&
  n[9] ≥ 0 && n[10] ≥ 0 && n[11] ≥ 0 && n[12] ≥ 0, Array[n, 12], Integers]
```

```
{}
```

```
Array[m, 7].Transpose[A]
```

```
{81543 m[1] - 86052 m[2] + 34891 m[3] - 7120 m[4] + 781 m[5] - 44 m[6] + m[7],
 82775 m[1] - 86340 m[2] + 34907 m[3] - 7120 m[4] + 781 m[5] - 44 m[6] + m[7],
 77231 m[1] - 84428 m[2] + 34691 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7],
 78463 m[1] - 84716 m[2] + 34707 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7],
 79695 m[1] - 85004 m[2] + 34723 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7],
 79407 m[1] - 84972 m[2] + 34723 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7],
 72919 m[1] - 82804 m[2] + 34491 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7],
 74151 m[1] - 83092 m[2] + 34507 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7],
 73927 m[1] - 83060 m[2] + 34507 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7],
 75159 m[1] - 83348 m[2] + 34523 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7],
 68607 m[1] - 81180 m[2] + 34291 m[3] - 7096 m[4] + 781 m[5] - 44 m[6] + m[7],
 69615 m[1] - 81436 m[2] + 34307 m[3] - 7096 m[4] + 781 m[5] - 44 m[6] + m[7]}
```

```
Array[m, 7].{3383255, -3537084, 1430763, -291896, 32021, -1804, 41}
```

```
3383255 m[1] - 3537084 m[2] + 1430763 m[3] -
 291896 m[4] + 32021 m[5] - 1804 m[6] + 41 m[7]
```

```
FindInstance[
 81543 m[1] - 86052 m[2] + 34891 m[3] - 7120 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  82775 m[1] - 86340 m[2] + 34907 m[3] - 7120 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  77231 m[1] - 84428 m[2] + 34691 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  78463 m[1] - 84716 m[2] + 34707 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  79695 m[1] - 85004 m[2] + 34723 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  79407 m[1] - 84972 m[2] + 34723 m[3] - 7112 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  72919 m[1] - 82804 m[2] + 34491 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  74151 m[1] - 83092 m[2] + 34507 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  73927 m[1] - 83060 m[2] + 34507 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  75159 m[1] - 83348 m[2] + 34523 m[3] - 7104 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  68607 m[1] - 81180 m[2] + 34291 m[3] - 7096 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  69615 m[1] - 81436 m[2] + 34307 m[3] - 7096 m[4] + 781 m[5] - 44 m[6] + m[7] ≥ 0 &&
  3383255 m[1] - 3537084 m[2] + 1430763 m[3] - 291896 m[4] +
    32021 m[5] - 1804 m[6] + 41 m[7] < 0, Array[m, 7], Integers]
```

```
{{m[1] → 10481, m[2] → 50373, m[3] → 99745, m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0}}
```

```
Array[m, 7] /.
 {m[1] → 10481, m[2] → 50373, m[3] → 99745, m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0}
```

```
{10481, 50373, 99745, 0, 0, 0, 0}
```

```
GCD[10481, 50373, 99745, 0, 0, 0, 0]
```

```
1
```

```
{{81543, -86052, 34891, -7120, 781, -44, 1},
  {82775, -86340, 34907, -7120, 781, -44, 1},
  {77231, -84428, 34691, -7112, 781, -44, 1},
  {78463, -84716, 34707, -7112, 781, -44, 1},
  {79695, -85004, 34723, -7112, 781, -44, 1},
  {79407, -84972, 34723, -7112, 781, -44, 1},
  {72919, -82804, 34491, -7104, 781, -44, 1},
  {74151, -83092, 34507, -7104, 781, -44, 1},
  {73927, -83060, 34507, -7104, 781, -44, 1},
  {75159, -83348, 34523, -7104, 781, -44, 1},
  {68607, -81180, 34291, -7096, 781, -44, 1},
  {69615, -81436, 34307, -7096, 781, -44, 1}} // MatrixForm
```

$$\begin{pmatrix} 81543 & -86052 & 34891 & -7120 & 781 & -44 & 1 \\ 82775 & -86340 & 34907 & -7120 & 781 & -44 & 1 \\ 77231 & -84428 & 34691 & -7112 & 781 & -44 & 1 \\ 78463 & -84716 & 34707 & -7112 & 781 & -44 & 1 \\ 79695 & -85004 & 34723 & -7112 & 781 & -44 & 1 \\ 79407 & -84972 & 34723 & -7112 & 781 & -44 & 1 \\ 72919 & -82804 & 34491 & -7104 & 781 & -44 & 1 \\ 74151 & -83092 & 34507 & -7104 & 781 & -44 & 1 \\ 73927 & -83060 & 34507 & -7104 & 781 & -44 & 1 \\ 75159 & -83348 & 34523 & -7104 & 781 & -44 & 1 \\ 68607 & -81180 & 34291 & -7096 & 781 & -44 & 1 \\ 69615 & -81436 & 34307 & -7096 & 781 & -44 & 1 \end{pmatrix}$$

```
{10 481, 50 373, 99 745, 0, 0, 0, 0}.
 {3 383 255, -3 537 084, 1 430 763, -291 896, 32 021, -1804, 41}
```

$$-2\,181\,242$$

```
{10 481, 50 373, 99 745, 0, 0, 0, 0}.
```

$$\text{Transpose}\left[\begin{pmatrix} 81\,543 & -86\,052 & 34\,891 & -7120 & 781 & -44 & 1 \\ 82\,775 & -86\,340 & 34\,907 & -7120 & 781 & -44 & 1 \\ 77\,231 & -84\,428 & 34\,691 & -7112 & 781 & -44 & 1 \\ 78\,463 & -84\,716 & 34\,707 & -7112 & 781 & -44 & 1 \\ 79\,695 & -85\,004 & 34\,723 & -7112 & 781 & -44 & 1 \\ 79\,407 & -84\,972 & 34\,723 & -7112 & 781 & -44 & 1 \\ 72\,919 & -82\,804 & 34\,491 & -7104 & 781 & -44 & 1 \\ 74\,151 & -83\,092 & 34\,507 & -7104 & 781 & -44 & 1 \\ 73\,927 & -83\,060 & 34\,507 & -7104 & 781 & -44 & 1 \\ 75\,159 & -83\,348 & 34\,523 & -7104 & 781 & -44 & 1 \\ 68\,607 & -81\,180 & 34\,291 & -7096 & 781 & -44 & 1 \\ 69\,615 & -81\,436 & 34\,307 & -7096 & 781 & -44 & 1 \end{pmatrix}\right]$$

```
{157 582, 158 670, 16 820 262, 16 821 350, 16 822 438, 15 415 846,
 33 482 942, 33 484 030, 32 748 222, 32 749 310, 50 145 622, 49 410 902}
```

```
poly11 = listmod128[[11]]
```

$$(-9+x)^4\,(-7+x)^7\,(5+x)^{25}\left(-25\,904+17\,829\,x-4784\,x^2+626\,x^3-40\,x^4+x^5\right)$$

```
p11 = poly11 / minipoly[poly11] // Factor
```

$$(-9+x)^3\,(-7+x)^6\,(5+x)^{24}$$

```
feasiblesubcharpolylist[
 (-9+x)^4 (-7+x)^7 (5+x)^25 (-25904+17829 x-4784 x^2+626 x^3-40 x^4+x^5)]
```

$$\{(-9+x)\,(-7+x)\,(-5+x)\,\left(1843-1346\,x+316\,x^2-30\,x^3+x^4\right),$$
$$(-9+x)\,(-7+x)\,\left(-9183+8573\,x-2926\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)\,(-7+x)\,\left(-8599+8429\,x-2918\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)^2\,(-7+x)\,(-5+x)\,\left(-195+127\,x-21\,x^2+x^3\right),$$
$$(-9+x)\,(-7+x)^2\,\left(1249-1028\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)\,(-7+x)\,\left(-8711+8445\,x-2918\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)^2\,(-5+x)\,\left(1381-1084\,x+274\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)\,\left(61\,921-68\,082\,x+28\,887\,x^2-6180\,x^3+711\,x^4-42\,x^5+x^6\right),$$
$$(-11+x)\,(-9+x)\,(-7+x)^2\,(-5+x)\,\left(23-12\,x+x^2\right),$$
$$(-9+x)\,(-7+x)\,\left(-8159+8301\,x-2910\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)^2\,(-7+x)^2\,\left(-129+99\,x-19\,x^2+x^3\right),$$
$$(-9+x)^2\,(-7+x)\,\left(919-822\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-11+x)\,(-9+x)\,(-7+x)^2\,\left(-107+83\,x-17\,x^2+x^3\right),$$
$$(-11+x)\,(-9+x)^2\,(-7+x)\,(-5+x)\,\left(17-10\,x+x^2\right),$$
$$(-9+x)\,(-7+x)\,\left(-8383+8333\,x-2910\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)\,(-7+x)\,\left(-8527+8349\,x-2910\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)\,\left(59\,401-66\,938\,x+28\,719\,x^2-6172\,x^3+711\,x^4-42\,x^5+x^6\right),$$
$$(-9+x)\,(-7+x)\,\left(-7655+8173\,x-2902\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)^2\,(-7+x)\,\left(863-814\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)^2\,(-7+x)\,\left(879-814\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)\,(-7+x)\,\left(-7879+8205\,x-2902\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)\,(-7+x)\,\left(-8023+8221\,x-2902\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)^2\,(-7+x)\,\left(807-806\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)^2\,(-7+x)\,\left(823-806\,x+232\,x^2-26\,x^3+x^4\right)\}$$

```
{(-9 + x) (-7 + x) (-5 + x) (1843 - 1346 x + 316 x^2 - 30 x^3 + x^4),
  (-9 + x) (-7 + x) (-9183 + 8573 x - 2926 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8599 + 8429 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (-5 + x) (-195 + 127 x - 21 x^2 + x^3),
  (-9 + x) (-7 + x)^2 (1249 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-8711 + 8445 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-5 + x) (1381 - 1084 x + 274 x^2 - 28 x^3 + x^4),
  (-9 + x) (61921 - 68082 x + 28887 x^2 - 6180 x^3 + 711 x^4 - 42 x^5 + x^6),
  (-11 + x) (-9 + x) (-7 + x)^2 (-5 + x) (23 - 12 x + x^2),
  (-9 + x) (-7 + x) (-8159 + 8301 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x)^2 (-129 + 99 x - 19 x^2 + x^3),
  (-9 + x)^2 (-7 + x) (919 - 822 x + 232 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x)^2 (-107 + 83 x - 17 x^2 + x^3),
  (-11 + x) (-9 + x)^2 (-7 + x) (-5 + x) (17 - 10 x + x^2),
  (-9 + x) (-7 + x) (-8383 + 8333 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8527 + 8349 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (59401 - 66938 x + 28719 x^2 - 6172 x^3 + 711 x^4 - 42 x^5 + x^6),
  (-9 + x) (-7 + x) (-7655 + 8173 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (863 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (-7879 + 8205 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8023 + 8221 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (823 - 806 x + 232 x^2 - 26 x^3 + x^4)} // Length
```

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```
CoefficientList[{(-9 + x) (-7 + x) (-5 + x) (1843 - 1346 x + 316 x^2 - 30 x^3 + x^4),
  (-9 + x) (-7 + x) (-9183 + 8573 x - 2926 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8599 + 8429 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (-5 + x) (-195 + 127 x - 21 x^2 + x^3),
  (-9 + x) (-7 + x)^2 (1249 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-8711 + 8445 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-5 + x) (1381 - 1084 x + 274 x^2 - 28 x^3 + x^4),
  (-9 + x) (61 921 - 68 082 x + 28 887 x^2 - 6180 x^3 + 711 x^4 - 42 x^5 + x^6),
  (-11 + x) (-9 + x) (-7 + x)^2 (-5 + x) (23 - 12 x + x^2),
  (-9 + x) (-7 + x) (-8159 + 8301 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x)^2 (-129 + 99 x - 19 x^2 + x^3),
  (-9 + x)^2 (-7 + x) (919 - 822 x + 232 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x)^2 (-107 + 83 x - 17 x^2 + x^3),
  (-11 + x) (-9 + x)^2 (-7 + x) (-5 + x) (17 - 10 x + x^2),
  (-9 + x) (-7 + x) (-8383 + 8333 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8527 + 8349 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (59 401 - 66 938 x + 28 719 x^2 - 6172 x^3 + 711 x^4 - 42 x^5 + x^6),
  (-9 + x) (-7 + x) (-7655 + 8173 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (863 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (-7879 + 8205 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8023 + 8221 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (823 - 806 x + 232 x^2 - 26 x^3 + x^4)}, x]
```

```
{{-580 545, 687 539, -330 721, 84 747, -12 587, 1089, -51, 1},
 {-578 529, 687 027, -330 689, 84 747, -12 587, 1089, -51, 1},
 {-541 737, 668 611, -327 297, 84 475, -12 579, 1089, -51, 1},
 {-552 825, 672 435, -327 729, 84 491, -12 579, 1089, -51, 1},
 {-550 809, 671 923, -327 697, 84 491, -12 579, 1089, -51, 1},
 {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
 {-559 305, 675 171, -328 097, 84 507, -12 579, 1089, -51, 1},
 {-557 289, 674 659, -328 065, 84 507, -12 579, 1089, -51, 1},
 {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
 {-514 017, 653 507, -324 305, 84 219, -12 571, 1089, -51, 1},
 {-512 001, 652 995, -324 273, 84 219, -12 571, 1089, -51, 1},
 {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
 {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
 {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
 {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
 {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
 {-534 609, 661 843, -325 409, 84 267, -12 571, 1089, -51, 1},
 {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
 {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
 {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
 {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
 {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
 {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
 {-466 641, 627 363, -318 961, 83 739, -12 555, 1089, -51, 1}}
```

```
CoefficientList[D[poly11, x] / p11 // Factor, x]
```

```
{-23 396 345, 27 945 611, -13 505 961, 3 469 539, -515 891, 44 649, -2091, 41}
```

```
A = {{-580 545, 687 539, -330 721, 84 747, -12 587, 1089, -51, 1},
    {-578 529, 687 027, -330 689, 84 747, -12 587, 1089, -51, 1},
    {-541 737, 668 611, -327 297, 84 475, -12 579, 1089, -51, 1},
    {-552 825, 672 435, -327 729, 84 491, -12 579, 1089, -51, 1},
    {-550 809, 671 923, -327 697, 84 491, -12 579, 1089, -51, 1},
    {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
    {-559 305, 675 171, -328 097, 84 507, -12 579, 1089, -51, 1},
    {-557 289, 674 659, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-514 017, 653 507, -324 305, 84 219, -12 571, 1089, -51, 1},
    {-512 001, 652 995, -324 273, 84 219, -12 571, 1089, -51, 1},
    {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
    {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
    {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
    {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
    {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
    {-534 609, 661 843, -325 409, 84 267, -12 571, 1089, -51, 1},
    {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
    {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
    {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
    {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
    {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
    {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
    {-466 641, 627 363, -318 961, 83 739, -12 555, 1089, -51, 1}};

MatrixRank[A]

5
```

```
Solve[Array[n, 24].{{-580 545, 687 539, -330 721, 84 747, -12 587, 1089, -51, 1},
    {-578 529, 687 027, -330 689, 84 747, -12 587, 1089, -51, 1},
    {-541 737, 668 611, -327 297, 84 475, -12 579, 1089, -51, 1},
    {-552 825, 672 435, -327 729, 84 491, -12 579, 1089, -51, 1},
    {-550 809, 671 923, -327 697, 84 491, -12 579, 1089, -51, 1},
    {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
    {-559 305, 675 171, -328 097, 84 507, -12 579, 1089, -51, 1},
    {-557 289, 674 659, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-514 017, 653 507, -324 305, 84 219, -12 571, 1089, -51, 1},
    {-512 001, 652 995, -324 273, 84 219, -12 571, 1089, -51, 1},
    {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
    {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
    {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
    {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
    {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
    {-534 609, 661 843, -325 409, 84 267, -12 571, 1089, -51, 1},
    {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
    {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
    {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
    {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
    {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
    {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
    {-466 641, 627 363, -318 961, 83 739, -12 555, 1089, -51, 1}} ==
  {-23 396 345, 27 945 611, -13 505 961, 3 469 539, -515 891,
   44 649, -2091, 41}, Array[n, 24]]
{}

Solve[Array[n, 24].A == {-23 396 345, 27 945 611,
   -13 505 961, 3 469 539, -515 891, 44 649, -2091, 41}, Array[n, 24]]
{}
```

```
Array[m, 8].Transpose[A]
```

```
{-580 545 m[1] + 687 539 m[2] - 330 721 m[3] + 84 747 m[4] -
   12 587 m[5] + 1089 m[6] - 51 m[7] + m[8], -578 529 m[1] + 687 027 m[2] -
   330 689 m[3] + 84 747 m[4] - 12 587 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -541 737 m[1] + 668 611 m[2] - 327 297 m[3] + 84 475 m[4] - 12 579 m[5] +
   1089 m[6] - 51 m[7] + m[8], -552 825 m[1] + 672 435 m[2] -
   327 729 m[3] + 84 491 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -550 809 m[1] + 671 923 m[2] - 327 697 m[3] + 84 491 m[4] - 12 579 m[5] +
   1089 m[6] - 51 m[7] + m[8], -548 793 m[1] + 671 411 m[2] -
   327 665 m[3] + 84 491 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -559 305 m[1] + 675 171 m[2] - 328 097 m[3] + 84 507 m[4] - 12 579 m[5] +
   1089 m[6] - 51 m[7] + m[8], -557 289 m[1] + 674 659 m[2] -
   328 065 m[3] + 84 507 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -557 865 m[1] + 674 723 m[2] - 328 065 m[3] + 84 507 m[4] - 12 579 m[5] +
   1089 m[6] - 51 m[7] + m[8], -514 017 m[1] + 653 507 m[2] -
   324 305 m[3] + 84 219 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -512 001 m[1] + 652 995 m[2] - 324 273 m[3] + 84 219 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -521 073 m[1] + 656 307 m[2] -
   324 673 m[3] + 84 235 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -519 057 m[1] + 655 795 m[2] - 324 641 m[3] + 84 235 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -530 145 m[1] + 659 619 m[2] -
   325 073 m[3] + 84 251 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -528 129 m[1] + 659 107 m[2] - 325 041 m[3] + 84 251 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -537 201 m[1] + 662 419 m[2] -
   325 441 m[3] + 84 267 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -534 609 m[1] + 661 843 m[2] - 325 409 m[3] + 84 267 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -482 265 m[1] + 637 379 m[2] -
   321 249 m[3] + 83 963 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -489 321 m[1] + 640 179 m[2] - 321 617 m[3] + 83 979 m[4] - 12 563 m[5] +
   1089 m[6] - 51 m[7] + m[8], -498 393 m[1] + 643 491 m[2] -
   322 017 m[3] + 83 995 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -496 377 m[1] + 642 979 m[2] - 321 985 m[3] + 83 995 m[4] - 12 563 m[5] +
   1089 m[6] - 51 m[7] + m[8], -505 449 m[1] + 646 291 m[2] -
   322 385 m[3] + 84 011 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -457 569 m[1] + 624 051 m[2] - 318 561 m[3] + 83 723 m[4] - 12 555 m[5] +
   1089 m[6] - 51 m[7] + m[8], -466 641 m[1] + 627 363 m[2] -
   318 961 m[3] + 83 739 m[4] - 12 555 m[5] + 1089 m[6] - 51 m[7] + m[8]}
```

```
Array[m, 8].
 {-23 396 345, 27 945 611, -13 505 961, 3 469 539, -515 891, 44 649, -2091, 41}
```

```
-23 396 345 m[1] + 27 945 611 m[2] - 13 505 961 m[3] +
 3 469 539 m[4] - 515 891 m[5] + 44 649 m[6] - 2091 m[7] + 41 m[8]
```

```
FindInstance[
 -580 545 m[1] + 687 539 m[2] - 330 721 m[3] + 84 747 m[4] - 12 587 m[5] + 1089 m[6] -
    51 m[7] + m[8] ≥ 0 && -578 529 m[1] + 687 027 m[2] - 330 689 m[3] +
    84 747 m[4] - 12 587 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -541 737 m[1] + 668 611 m[2] - 327 297 m[3] + 84 475 m[4] - 12 579 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -552 825 m[1] + 672 435 m[2] -
    327 729 m[3] + 84 491 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -550 809 m[1] + 671 923 m[2] - 327 697 m[3] + 84 491 m[4] - 12 579 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -548 793 m[1] + 671 411 m[2] -
    327 665 m[3] + 84 491 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -559 305 m[1] + 675 171 m[2] - 328 097 m[3] + 84 507 m[4] - 12 579 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -557 289 m[1] + 674 659 m[2] -
    328 065 m[3] + 84 507 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -557 865 m[1] + 674 723 m[2] - 328 065 m[3] + 84 507 m[4] - 12 579 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -514 017 m[1] + 653 507 m[2] -
    324 305 m[3] + 84 219 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -512 001 m[1] + 652 995 m[2] - 324 273 m[3] + 84 219 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -521 073 m[1] + 656 307 m[2] -
    324 673 m[3] + 84 235 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -519 057 m[1] + 655 795 m[2] - 324 641 m[3] + 84 235 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -530 145 m[1] + 659 619 m[2] -
    325 073 m[3] + 84 251 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -528 129 m[1] + 659 107 m[2] - 325 041 m[3] + 84 251 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -537 201 m[1] + 662 419 m[2] -
    325 441 m[3] + 84 267 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -534 609 m[1] + 661 843 m[2] - 325 409 m[3] + 84 267 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -482 265 m[1] + 637 379 m[2] -
    321 249 m[3] + 83 963 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -489 321 m[1] + 640 179 m[2] - 321 617 m[3] + 83 979 m[4] - 12 563 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -498 393 m[1] + 643 491 m[2] -
    322 017 m[3] + 83 995 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -496 377 m[1] + 642 979 m[2] - 321 985 m[3] + 83 995 m[4] - 12 563 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -505 449 m[1] + 646 291 m[2] -
    322 385 m[3] + 84 011 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -457 569 m[1] + 624 051 m[2] - 318 561 m[3] + 83 723 m[4] - 12 555 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -466 641 m[1] + 627 363 m[2] -
    318 961 m[3] + 83 739 m[4] - 12 555 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -23 396 345 m[1] + 27 945 611 m[2] - 13 505 961 m[3] + 3 469 539 m[4] -
    515 891 m[5] + 44 649 m[6] - 2091 m[7] + 41 m[8] < 0, Array[m, 8], Integers]
```

```
{{m[1] → 11 780, m[2] → 28 348, m[3] → 38 250,
  m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0, m[8] → 0}}
```

```
Array[m, 8] /. {m[1] → 11 780, m[2] → 28 348,
  m[3] → 38 250, m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0, m[8] → 0}
```

```
{11 780, 28 348, 38 250, 0, 0, 0, 0, 0}
```

```
GCD[11 780, 28 348, 38 250, 0, 0, 0, 0, 0]
```

```
2
```

```
{5890, 14 174, 19 125, 0, 0, 0, 0, 0} // Reverse
```

```
{0, 0, 0, 0, 0, 19 125, 14 174, 5890}
```

```
{11 780, 28 348, 38 250, 0, 0, 0, 0, 0} / 2
```

```
{5890, 14 174, 19 125, 0, 0, 0, 0, 0}
```

```
{5890, 14 174, 19 125, 0, 0, 0, 0, 0}.
 {-23 396 345, 27 945 611, -13 505 961, 3 469 539, -515 891, 44 649, -2091, 41}
```

```
-4 885 861
```

```
{5890, 14 174, 19 125, 0, 0, 0, 0, 0}.
 Transpose[{{-580 545, 687 539, -330 721, 84 747, -12 587, 1089, -51, 1},
    {-578 529, 687 027, -330 689, 84 747, -12 587, 1089, -51, 1},
    {-541 737, 668 611, -327 297, 84 475, -12 579, 1089, -51, 1},
    {-552 825, 672 435, -327 729, 84 491, -12 579, 1089, -51, 1},
    {-550 809, 671 923, -327 697, 84 491, -12 579, 1089, -51, 1},
    {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
    {-559 305, 675 171, -328 097, 84 507, -12 579, 1089, -51, 1},
    {-557 289, 674 659, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-514 017, 653 507, -324 305, 84 219, -12 571, 1089, -51, 1},
    {-512 001, 652 995, -324 273, 84 219, -12 571, 1089, -51, 1},
    {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
    {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
    {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
    {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
    {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
    {-534 609, 661 843, -325 409, 84 267, -12 571, 1089, -51, 1},
    {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
    {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
    {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
    {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
    {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
    {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
    {-466 641, 627 363, -318 961, 83 739, -12 555, 1089, -51, 1}}]
```

```
{728 611, 5 957 763, 26 506 259, 7 137 315, 12 366 467, 17 595 619,
 712 179, 5 941 331, 3 455 827, 32 914 963, 38 144 115, 24 004 323,
 29 233 475, 9 864 531, 15 093 683, 953 891, 8 668 547, 49 781 971,
 40 871 331, 26 731 539, 31 960 691, 17 820 899, 57 738 339, 43 598 547}
```

```
{11 780, 28 348, 38 250, 0, 0, 0, 0, 0}.
 {-23 396 345, 27 945 611, -13 505 961, 3 469 539, -515 891, 44 649, -2091, 41}
```

```
-9 771 722
```

```
{11780, 28348, 38250, 0, 0, 0, 0, 0}.
 Transpose[{{-580545, 687539, -330721, 84747, -12587, 1089, -51, 1},
   {-578529, 687027, -330689, 84747, -12587, 1089, -51, 1},
   {-541737, 668611, -327297, 84475, -12579, 1089, -51, 1},
   {-552825, 672435, -327729, 84491, -12579, 1089, -51, 1},
   {-550809, 671923, -327697, 84491, -12579, 1089, -51, 1},
   {-548793, 671411, -327665, 84491, -12579, 1089, -51, 1},
   {-559305, 675171, -328097, 84507, -12579, 1089, -51, 1},
   {-557289, 674659, -328065, 84507, -12579, 1089, -51, 1},
   {-557865, 674723, -328065, 84507, -12579, 1089, -51, 1},
   {-514017, 653507, -324305, 84219, -12571, 1089, -51, 1},
   {-512001, 652995, -324273, 84219, -12571, 1089, -51, 1},
   {-521073, 656307, -324673, 84235, -12571, 1089, -51, 1},
   {-519057, 655795, -324641, 84235, -12571, 1089, -51, 1},
   {-530145, 659619, -325073, 84251, -12571, 1089, -51, 1},
   {-528129, 659107, -325041, 84251, -12571, 1089, -51, 1},
   {-537201, 662419, -325441, 84267, -12571, 1089, -51, 1},
   {-534609, 661843, -325409, 84267, -12571, 1089, -51, 1},
   {-482265, 637379, -321249, 83963, -12563, 1089, -51, 1},
   {-489321, 640179, -321617, 83979, -12563, 1089, -51, 1},
   {-498393, 643491, -322017, 83995, -12563, 1089, -51, 1},
   {-496377, 642979, -321985, 83995, -12563, 1089, -51, 1},
   {-505449, 646291, -322385, 84011, -12563, 1089, -51, 1},
   {-457569, 624051, -318561, 83723, -12555, 1089, -51, 1},
   {-466641, 627363, -318961, 83739, -12555, 1089, -51, 1}}]
{1457222, 11915526, 53012518, 14274630, 24732934, 35191238,
 1424358, 11882662, 6911654, 65829926, 76288230, 48008646,
 58466950, 19729062, 30187366, 1907782, 17337094, 99563942,
 81742662, 53463078, 63921382, 35641798, 115476678, 87197094}
```

```
poly12 = listmod128[[12]]
```

$$(-11+x)\,(-9+x)^4\,(-7+x)^9\,(5+x)^{25}\,\left(48-15\,x+x^2\right)$$

```
p12 = poly12 / minipoly[poly12] // Factor
```

$$(-9+x)^3\,(-7+x)^8\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-11 + x) (-9 + x)^4 (-7 + x)^9 (5 + x)^25 (48 - 15 x + x^2)]
```

```
{(-11 + x) (-5 + x) (-215 + 131 x - 21 x^2 + x^3), (-11 + x) (59 - 16 x + x^2) (17 - 10 x + x^2),
 (-11 + x) (1019 - 862 x + 236 x^2 - 26 x^3 + x^4), (-11 + x) (-9 + x) (-5 + x) (23 - 12 x + x^2),
 (-9 + x) (1281 - 1028 x + 270 x^2 - 28 x^3 + x^4), (-11 + x) (-7 + x)^2 (19 - 12 x + x^2),
 (-11 + x) (947 - 854 x + 236 x^2 - 26 x^3 + x^4), (-11 + x) (-9 + x) (-107 + 83 x - 17 x^2 + x^3),
 (59 - 16 x + x^2) (-179 + 127 x - 21 x^2 + x^3), (-9 + x) (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4),
 (-11 + x) (-7 + x) (-125 + 103 x - 19 x^2 + x^3), (-11 + x) (-9 + x)^2 (11 - 8 x + x^2),
 -9769 + 10 197 x - 3442 x^2 + 522 x^3 - 37 x^4 + x^5, (-9 + x) (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4),
 (-11 + x) (-9 + x) (-7 + x) (13 - 10 x + x^2), (-9 + x)^2 (-113 + 99 x - 19 x^2 + x^3),
 (-9 + x) (1033 - 1004 x + 270 x^2 - 28 x^3 + x^4), (-9 + x)^2 (-7 + x) (15 - 12 x + x^2)}
```

```
{(-11 + x) (-5 + x) (-215 + 131 x - 21 x^2 + x^3),
  (-11 + x) (59 - 16 x + x^2) (17 - 10 x + x^2), (-11 + x) (1019 - 862 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-5 + x) (23 - 12 x + x^2), (-9 + x) (1281 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-11 + x) (-7 + x)^2 (19 - 12 x + x^2), (-11 + x) (947 - 854 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-107 + 83 x - 17 x^2 + x^3), (59 - 16 x + x^2) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x) (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4), (-11 + x) (-7 + x) (-125 + 103 x - 19 x^2 + x^3),
  (-11 + x) (-9 + x)^2 (11 - 8 x + x^2), -9769 + 10 197 x - 3442 x^2 + 522 x^3 - 37 x^4 + x^5,
  (-9 + x) (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4), (-11 + x) (-9 + x) (-7 + x) (13 - 10 x + x^2),
  (-9 + x)^2 (-113 + 99 x - 19 x^2 + x^3), (-9 + x) (1033 - 1004 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (15 - 12 x + x^2)} // Length
```

```
18
```

```
CoefficientList[{(-11 + x) (-5 + x) (-215 + 131 x - 21 x^2 + x^3),
  (-11 + x) (59 - 16 x + x^2) (17 - 10 x + x^2), (-11 + x) (1019 - 862 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-5 + x) (23 - 12 x + x^2), (-9 + x) (1281 - 1028 x + 270 x^2 - 28 x^3 + x^4),
  (-11 + x) (-7 + x)^2 (19 - 12 x + x^2), (-11 + x) (947 - 854 x + 236 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-107 + 83 x - 17 x^2 + x^3), (59 - 16 x + x^2) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x) (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4), (-11 + x) (-7 + x) (-125 + 103 x - 19 x^2 + x^3),
  (-11 + x) (-9 + x)^2 (11 - 8 x + x^2), -9769 + 10 197 x - 3442 x^2 + 522 x^3 - 37 x^4 + x^5,
  (-9 + x) (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x) (13 - 10 x + x^2), (-9 + x)^2 (-113 + 99 x - 19 x^2 + x^3),
  (-9 + x) (1033 - 1004 x + 270 x^2 - 28 x^3 + x^4), (-9 + x)^2 (-7 + x) (15 - 12 x + x^2)}, x]
```

```
{{-11 825, 10 645, -3466, 522, -37, 1}, {-11 033, 10 485, -3458, 522, -37, 1},
 {-11 209, 10 501, -3458, 522, -37, 1}, {-11 385, 10 517, -3458, 522, -37, 1},
 {-11 529, 10 533, -3458, 522, -37, 1}, {-10 241, 10 325, -3450, 522, -37, 1},
 {-10 417, 10 341, -3450, 522, -37, 1}, {-10 593, 10 357, -3450, 522, -37, 1},
 {-10 561, 10 357, -3450, 522, -37, 1}, {-10 737, 10 373, -3450, 522, -37, 1},
 {-9625, 10 181, -3442, 522, -37, 1}, {-9801, 10 197, -3442, 522, -37, 1},
 {-9769, 10 197, -3442, 522, -37, 1}, {-9945, 10 213, -3442, 522, -37, 1},
 {-9009, 10 037, -3434, 522, -37, 1}, {-9153, 10 053, -3434, 522, -37, 1},
 {-9297, 10 069, -3434, 522, -37, 1}, {-8505, 9909, -3426, 522, -37, 1}}
```

```
CoefficientList[D[poly12, x] / p12 // Factor, x]
```

```
{-476 745, 433 821, -141 930, 21 402, -1517, 41}
```

```
Solve[Array[n, 18].
    {{-11 825, 10 645, -3466, 522, -37, 1}, {-11 033, 10 485, -3458, 522, -37, 1},
     {-11 209, 10 501, -3458, 522, -37, 1}, {-11 385, 10 517, -3458, 522, -37, 1},
     {-11 529, 10 533, -3458, 522, -37, 1}, {-10 241, 10 325, -3450, 522, -37, 1},
     {-10 417, 10 341, -3450, 522, -37, 1}, {-10 593, 10 357, -3450, 522, -37, 1},
     {-10 561, 10 357, -3450, 522, -37, 1}, {-10 737, 10 373, -3450, 522, -37, 1},
     {-9625, 10 181, -3442, 522, -37, 1}, {-9801, 10 197, -3442, 522, -37, 1},
     {-9769, 10 197, -3442, 522, -37, 1}, {-9945, 10 213, -3442, 522, -37, 1},
     {-9009, 10 037, -3434, 522, -37, 1}, {-9153, 10 053, -3434, 522, -37, 1},
     {-9297, 10 069, -3434, 522, -37, 1}, {-8505, 9909, -3426, 522, -37, 1}} ==
   {-476 745, 433 821, -141 930, 21 402, -1517, 41}, Array[n, 18]]
```

```
Solve::svars : Equations may not give solutions for all "solve" variables.  >>
```

```
{{n[13] → 42 - 2 n[1] - 2 n[2] - n[3] - 2 n[6] - n[7] - n[9] - n[11], n[16] →
    24 - n[3] - 2 n[4] - n[5] - n[7] - 2 n[8] - n[10] - n[11] - 2 n[12] - n[14] - 2 n[15],
  n[17] → 75 - n[1] - n[3] - 2 n[4] - 3 n[5] + n[6] - n[8] - n[9] - 2 n[10] +
    n[11] - n[14] + n[15], n[18] → -100 + 2 n[1] + n[2] + 2 n[3] +
    3 n[4] + 3 n[5] + n[7] + 2 n[8] + n[9] + 2 n[10] + n[12] + n[14]}}
```

```
Array[n, 18] /.
 Solve[-n[13] + 42 - 2 n[1] - 2 n[2] - n[3] - 2 n[6] - n[7] - n[9] - n[11] == 0 &&
   -n[16] + 24 - n[3] - 2 n[4] - n[5] -
     n[7] - 2 n[8] - n[10] - n[11] - 2 n[12] - n[14] - 2 n[15] == 0 &&
   -n[17] + 75 - n[1] - n[3] - 2 n[4] - 3 n[5] +
     n[6] - n[8] - n[9] - 2 n[10] + n[11] - n[14] + n[15] == 0 &&
   -n[18] - 100 + 2 n[1] + n[2] + 2 n[3] + 3 n[4] + 3 n[5] + n[7] +
     2 n[8] + n[9] + 2 n[10] + n[12] + n[14] == 0 && n[1] ≥ 0 && n[2] ≥ 0 &&
   n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 && n[7] ≥ 0 && n[8] ≥ 0 &&
   n[9] ≥ 0 && n[10] ≥ 0 && n[11] ≥ 0 && n[12] ≥ 0 && n[13] ≥ 0 && n[14] ≥ 0 &&
   n[15] ≥ 0 && n[16] ≥ 0 && n[17] ≥ 0 && n[18] ≥ 0, Array[n, 18], Integers]
```

```
{{19, 0, 4, 2, 16, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {19, 1, 2, 3, 16, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {19, 2, 0, 4, 16, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {20, 0, 0, 4, 16, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {20, 0, 1, 3, 16, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {20, 0, 1, 4, 15, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {20, 0, 2, 2, 16, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {20, 0, 2, 3, 15, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0},
 {20, 1, 0, 3, 16, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {20, 1, 0, 4, 15, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0},
 {21, 0, 0, 2, 16, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {21, 0, 0, 3, 15, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0},
 {21, 0, 0, 3, 16, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0},
 {21, 0, 0, 4, 14, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0},
 {21, 0, 0, 4, 15, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0}}
```

```
poly13 = listmod128[[13]]
```

$$(-9+x)^4\ (-7+x)^7\ (5+x)^{25}\ \left(-25\,580+17\,757\,x-4780\,x^2+626\,x^3-40\,x^4+x^5\right)$$

```
p13 = poly13 / minipoly[poly13] // Factor
```

$$(-9+x)^3\ (-7+x)^6\ (5+x)^{24}$$

```
feasiblesubcharpolylist[
  (-9 + x)^4 (-7 + x)^7 (5 + x)^25 (-25580 + 17757 x - 4780 x^2 + 626 x^3 - 40 x^4 + x^5)]
```

$$\{(-9+x)(-7+x)(-9327+8589x-2926x^2+466x^3-35x^4+x^5),$$
$$(-9+x)(-7+x)(-8711+8445x-2918x^2+466x^3-35x^4+x^5),$$
$$(-9+x)(-7+x)(-8887+8461x-2918x^2+466x^3-35x^4+x^5),$$
$$(-11+x)(-9+x)(-7+x)^2(-5+x)(23-12x+x^2),$$
$$(-9+x)(-7+x)(-8999+8477x-2918x^2+466x^3-35x^4+x^5),$$
$$(-9+x)^2(-7+x)(919-822x+232x^2-26x^3+x^4),$$
$$(-11+x)(-9+x)(-7+x)^2(-107+83x-17x^2+x^3),$$
$$(-11+x)(-9+x)^2(-7+x)(-5+x)(17-10x+x^2),$$
$$(-9+x)(-7+x)(-8383+8333x-2910x^2+466x^3-35x^4+x^5),$$
$$(-9+x)(-7+x)^2(1193-1020x+270x^2-28x^3+x^4),$$
$$(-9+x)^2(-7+x)(951-822x+232x^2-26x^3+x^4),$$
$$(-9+x)(-7+x)(-8527+8349x-2910x^2+466x^3-35x^4+x^5),$$
$$(-9+x)(-7+x)(23-12x+x^2)(-377+167x-23x^2+x^3),$$
$$(-9+x)(-7+x)(-7655+8173x-2902x^2+466x^3-35x^4+x^5),$$
$$(-11+x)(-9+x)^2(-7+x)^2(11-8x+x^2),$$
$$(-9+x)^2(-7+x)(863-814x+232x^2-26x^3+x^4),$$
$$(-9+x)(-7+x)^2(1105-1012x+270x^2-28x^3+x^4),$$
$$(-9+x)^2(-7+x)(879-814x+232x^2-26x^3+x^4),$$
$$(-9+x)(-7+x)(-7879+8205x-2902x^2+466x^3-35x^4+x^5),$$
$$(-9+x)(-7+x)(-8023+8221x-2902x^2+466x^3-35x^4+x^5),$$
$$(-9+x)^2(-7+x)(807-806x+232x^2-26x^3+x^4),$$
$$(-9+x)(-7+x)^2(1033-1004x+270x^2-28x^3+x^4),$$
$$(-9+x)(-7+x)(59-16x+x^2)(-125+103x-19x^2+x^3),$$
$$(-9+x)^2(-7+x)(751-798x+232x^2-26x^3+x^4)\}$$

```
{(-9 + x) (-7 + x) (-9327 + 8589 x - 2926 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-9 + x) (-7 + x) (-8711 + 8445 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-9 + x) (-7 + x) (-8887 + 8461 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-11 + x) (-9 + x) (-7 + x)^2 (-5 + x) (23 - 12 x + x^2),
 (-9 + x) (-7 + x) (-8999 + 8477 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-9 + x)^2 (-7 + x) (919 - 822 x + 232 x^2 - 26 x^3 + x^4),
 (-11 + x) (-9 + x) (-7 + x)^2 (-107 + 83 x - 17 x^2 + x^3),
 (-11 + x) (-9 + x)^2 (-7 + x) (-5 + x) (17 - 10 x + x^2),
 (-9 + x) (-7 + x) (-8383 + 8333 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-9 + x) (-7 + x)^2 (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4),
 (-9 + x)^2 (-7 + x) (951 - 822 x + 232 x^2 - 26 x^3 + x^4),
 (-9 + x) (-7 + x) (-8527 + 8349 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-9 + x) (-7 + x) (23 - 12 x + x^2) (-377 + 167 x - 23 x^2 + x^3),
 (-9 + x) (-7 + x) (-7655 + 8173 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-11 + x) (-9 + x)^2 (-7 + x)^2 (11 - 8 x + x^2),
 (-9 + x)^2 (-7 + x) (863 - 814 x + 232 x^2 - 26 x^3 + x^4),
 (-9 + x) (-7 + x)^2 (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4),
 (-9 + x)^2 (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
 (-9 + x) (-7 + x) (-7879 + 8205 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-9 + x) (-7 + x) (-8023 + 8221 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
 (-9 + x)^2 (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
 (-9 + x) (-7 + x)^2 (1033 - 1004 x + 270 x^2 - 28 x^3 + x^4),
 (-9 + x) (-7 + x) (59 - 16 x + x^2) (-125 + 103 x - 19 x^2 + x^3),
 (-9 + x)^2 (-7 + x) (751 - 798 x + 232 x^2 - 26 x^3 + x^4)} // Length
```

```
24
```

```
CoefficientList[{(-9 + x) (-7 + x) (-9327 + 8589 x - 2926 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8711 + 8445 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8887 + 8461 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-11 + x) (-9 + x) (-7 + x)^2 (-5 + x) (23 - 12 x + x^2),
  (-9 + x) (-7 + x) (-8999 + 8477 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (919 - 822 x + 232 x^2 - 26 x^3 + x^4),
  (-11 + x) (-9 + x) (-7 + x)^2 (-107 + 83 x - 17 x^2 + x^3),
  (-11 + x) (-9 + x)^2 (-7 + x) (-5 + x) (17 - 10 x + x^2),
  (-9 + x) (-7 + x) (-8383 + 8333 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x)^2 (1193 - 1020 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (951 - 822 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (-8527 + 8349 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (23 - 12 x + x^2) (-377 + 167 x - 23 x^2 + x^3),
  (-9 + x) (-7 + x) (-7655 + 8173 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-11 + x) (-9 + x)^2 (-7 + x)^2 (11 - 8 x + x^2),
  (-9 + x)^2 (-7 + x) (863 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x)^2 (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (-7879 + 8205 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-8023 + 8221 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x)^2 (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (1033 - 1004 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (59 - 16 x + x^2) (-125 + 103 x - 19 x^2 + x^3),
  (-9 + x)^2 (-7 + x) (751 - 798 x + 232 x^2 - 26 x^3 + x^4)}, x]
```

```
{{-587 601, 690 339, -331 089, 84 763, -12 587, 1089, -51, 1},
 {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
 {-559 881, 675 235, -328 097, 84 507, -12 579, 1089, -51, 1},
 {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
 {-566 937, 678 035, -328 465, 84 523, -12 579, 1089, -51, 1},
 {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
 {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
 {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
 {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
 {-526 113, 658 595, -325 009, 84 251, -12 571, 1089, -51, 1},
 {-539 217, 662 931, -325 473, 84 267, -12 571, 1089, -51, 1},
 {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
 {-546 273, 665 731, -325 841, 84 283, -12 571, 1089, -51, 1},
 {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
 {-480 249, 636 867, -321 217, 83 963, -12 563, 1089, -51, 1},
 {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
 {-487 305, 639 667, -321 585, 83 979, -12 563, 1089, -51, 1},
 {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
 {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
 {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
 {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
 {-455 553, 623 539, -318 529, 83 723, -12 555, 1089, -51, 1},
 {-464 625, 626 851, -318 929, 83 739, -12 555, 1089, -51, 1},
 {-425 817, 607 923, -315 505, 83 467, -12 547, 1089, -51, 1}}
```

```
CoefficientList[D[poly13, x] / p13 // Factor, x]
```

```
{-23 056 145, 27 727 451, -13 457 769, 3 465 043, -515 739, 44 649, -2091, 41}
```

```
A = {{-587 601, 690 339, -331 089, 84 763, -12 587, 1089, -51, 1},
    {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
    {-559 881, 675 235, -328 097, 84 507, -12 579, 1089, -51, 1},
    {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-566 937, 678 035, -328 465, 84 523, -12 579, 1089, -51, 1},
    {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
    {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
    {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
    {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
    {-526 113, 658 595, -325 009, 84 251, -12 571, 1089, -51, 1},
    {-539 217, 662 931, -325 473, 84 267, -12 571, 1089, -51, 1},
    {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
    {-546 273, 665 731, -325 841, 84 283, -12 571, 1089, -51, 1},
    {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
    {-480 249, 636 867, -321 217, 83 963, -12 563, 1089, -51, 1},
    {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
    {-487 305, 639 667, -321 585, 83 979, -12 563, 1089, -51, 1},
    {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
    {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
    {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
    {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
    {-455 553, 623 539, -318 529, 83 723, -12 555, 1089, -51, 1},
    {-464 625, 626 851, -318 929, 83 739, -12 555, 1089, -51, 1},
    {-425 817, 607 923, -315 505, 83 467, -12 547, 1089, -51, 1}};

MatrixRank[A]

4
```

```
Solve[Array[n, 24].{{-587 601, 690 339, -331 089, 84 763, -12 587, 1089, -51, 1},
    {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
    {-559 881, 675 235, -328 097, 84 507, -12 579, 1089, -51, 1},
    {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
    {-566 937, 678 035, -328 465, 84 523, -12 579, 1089, -51, 1},
    {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
    {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
    {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
    {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
    {-526 113, 658 595, -325 009, 84 251, -12 571, 1089, -51, 1},
    {-539 217, 662 931, -325 473, 84 267, -12 571, 1089, -51, 1},
    {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
    {-546 273, 665 731, -325 841, 84 283, -12 571, 1089, -51, 1},
    {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
    {-480 249, 636 867, -321 217, 83 963, -12 563, 1089, -51, 1},
    {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
    {-487 305, 639 667, -321 585, 83 979, -12 563, 1089, -51, 1},
    {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
    {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
    {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
    {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
    {-455 553, 623 539, -318 529, 83 723, -12 555, 1089, -51, 1},
    {-464 625, 626 851, -318 929, 83 739, -12 555, 1089, -51, 1},
    {-425 817, 607 923, -315 505, 83 467, -12 547, 1089, -51, 1}} ==
  {-23 056 145, 27 727 451, -13 457 769, 3 465 043, -515 739,
   44 649, -2091, 41}, Array[n, 24]]
{}
```

```
Array[m, 8].Transpose[A]
```

```
{-587 601 m[1] + 690 339 m[2] - 331 089 m[3] + 84 763 m[4] -
   12 587 m[5] + 1089 m[6] - 51 m[7] + m[8], -548 793 m[1] + 671 411 m[2] -
   327 665 m[3] + 84 491 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -559 881 m[1] + 675 235 m[2] - 328 097 m[3] + 84 507 m[4] - 12 579 m[5] +
   1089 m[6] - 51 m[7] + m[8], -557 865 m[1] + 674 723 m[2] -
   328 065 m[3] + 84 507 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -566 937 m[1] + 678 035 m[2] - 328 465 m[3] + 84 523 m[4] - 12 579 m[5] +
   1089 m[6] - 51 m[7] + m[8], -521 073 m[1] + 656 307 m[2] -
   324 673 m[3] + 84 235 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -519 057 m[1] + 655 795 m[2] - 324 641 m[3] + 84 235 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -530 145 m[1] + 659 619 m[2] -
   325 073 m[3] + 84 251 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -528 129 m[1] + 659 107 m[2] - 325 041 m[3] + 84 251 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -526 113 m[1] + 658 595 m[2] -
   325 009 m[3] + 84 251 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -539 217 m[1] + 662 931 m[2] - 325 473 m[3] + 84 267 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -537 201 m[1] + 662 419 m[2] -
   325 441 m[3] + 84 267 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -546 273 m[1] + 665 731 m[2] - 325 841 m[3] + 84 283 m[4] - 12 571 m[5] +
   1089 m[6] - 51 m[7] + m[8], -482 265 m[1] + 637 379 m[2] -
   321 249 m[3] + 83 963 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -480 249 m[1] + 636 867 m[2] - 321 217 m[3] + 83 963 m[4] - 12 563 m[5] +
   1089 m[6] - 51 m[7] + m[8], -489 321 m[1] + 640 179 m[2] -
   321 617 m[3] + 83 979 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -487 305 m[1] + 639 667 m[2] - 321 585 m[3] + 83 979 m[4] - 12 563 m[5] +
   1089 m[6] - 51 m[7] + m[8], -498 393 m[1] + 643 491 m[2] -
   322 017 m[3] + 83 995 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -496 377 m[1] + 642 979 m[2] - 321 985 m[3] + 83 995 m[4] - 12 563 m[5] +
   1089 m[6] - 51 m[7] + m[8], -505 449 m[1] + 646 291 m[2] -
   322 385 m[3] + 84 011 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -457 569 m[1] + 624 051 m[2] - 318 561 m[3] + 83 723 m[4] - 12 555 m[5] +
   1089 m[6] - 51 m[7] + m[8], -455 553 m[1] + 623 539 m[2] -
   318 529 m[3] + 83 723 m[4] - 12 555 m[5] + 1089 m[6] - 51 m[7] + m[8],
 -464 625 m[1] + 626 851 m[2] - 318 929 m[3] + 83 739 m[4] - 12 555 m[5] +
   1089 m[6] - 51 m[7] + m[8], -425 817 m[1] + 607 923 m[2] -
   315 505 m[3] + 83 467 m[4] - 12 547 m[5] + 1089 m[6] - 51 m[7] + m[8]}
```

```
Array[m, 8].
 {-23 056 145, 27 727 451, -13 457 769, 3 465 043, -515 739, 44 649, -2091, 41}
```

```
-23 056 145 m[1] + 27 727 451 m[2] - 13 457 769 m[3] +
 3 465 043 m[4] - 515 739 m[5] + 44 649 m[6] - 2091 m[7] + 41 m[8]
```

```
FindInstance[
 -587 601 m[1] + 690 339 m[2] - 331 089 m[3] + 84 763 m[4] - 12 587 m[5] + 1089 m[6] -
    51 m[7] + m[8] ≥ 0 && -548 793 m[1] + 671 411 m[2] - 327 665 m[3] +
    84 491 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -559 881 m[1] + 675 235 m[2] - 328 097 m[3] + 84 507 m[4] - 12 579 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -557 865 m[1] + 674 723 m[2] -
    328 065 m[3] + 84 507 m[4] - 12 579 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -566 937 m[1] + 678 035 m[2] - 328 465 m[3] + 84 523 m[4] - 12 579 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -521 073 m[1] + 656 307 m[2] -
    324 673 m[3] + 84 235 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -519 057 m[1] + 655 795 m[2] - 324 641 m[3] + 84 235 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -530 145 m[1] + 659 619 m[2] -
    325 073 m[3] + 84 251 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -528 129 m[1] + 659 107 m[2] - 325 041 m[3] + 84 251 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -526 113 m[1] + 658 595 m[2] -
    325 009 m[3] + 84 251 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -539 217 m[1] + 662 931 m[2] - 325 473 m[3] + 84 267 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -537 201 m[1] + 662 419 m[2] -
    325 441 m[3] + 84 267 m[4] - 12 571 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -546 273 m[1] + 665 731 m[2] - 325 841 m[3] + 84 283 m[4] - 12 571 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -482 265 m[1] + 637 379 m[2] -
    321 249 m[3] + 83 963 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -480 249 m[1] + 636 867 m[2] - 321 217 m[3] + 83 963 m[4] - 12 563 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -489 321 m[1] + 640 179 m[2] -
    321 617 m[3] + 83 979 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -487 305 m[1] + 639 667 m[2] - 321 585 m[3] + 83 979 m[4] - 12 563 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -498 393 m[1] + 643 491 m[2] -
    322 017 m[3] + 83 995 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -496 377 m[1] + 642 979 m[2] - 321 985 m[3] + 83 995 m[4] - 12 563 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -505 449 m[1] + 646 291 m[2] -
    322 385 m[3] + 84 011 m[4] - 12 563 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -457 569 m[1] + 624 051 m[2] - 318 561 m[3] + 83 723 m[4] - 12 555 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -455 553 m[1] + 623 539 m[2] -
    318 529 m[3] + 83 723 m[4] - 12 555 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -464 625 m[1] + 626 851 m[2] - 318 929 m[3] + 83 739 m[4] - 12 555 m[5] +
    1089 m[6] - 51 m[7] + m[8] ≥ 0 && -425 817 m[1] + 607 923 m[2] -
    315 505 m[3] + 83 467 m[4] - 12 547 m[5] + 1089 m[6] - 51 m[7] + m[8] ≥ 0 &&
  -23 056 145 m[1] + 27 727 451 m[2] - 13 457 769 m[3] + 3 465 043 m[4] -
    515 739 m[5] + 44 649 m[6] - 2091 m[7] + 41 m[8] < 0, Array[m, 8], Integers]
```

```
{{m[1] → 0, m[2] → 152 389, m[3] → 2 438 199, m[4] → 29 410 745,
  m[5] → 316 965 325, m[6] → 0, m[7] → 0, m[8] → 2 198 761 371 082}}
```

```
Array[m, 8] /. {m[1] → 0, m[2] → 152 389, m[3] → 2 438 199, m[4] → 29 410 745,
  m[5] → 316 965 325, m[6] → 0, m[7] → 0, m[8] → 2 198 761 371 082}
```

```
{0, 152 389, 2 438 199, 29 410 745, 316 965 325, 0, 0, 2 198 761 371 082}
```

```
GCD[0, 152 389, 2 438 199, 29 410 745, 316 965 325, 0, 0, 2 198 761 371 082]
```

```
1
```

```
{0, 152 389, 2 438 199, 29 410 745, 316 965 325, 0, 0, 2 198 761 371 082}.
 {-23 056 145, 27 727 451, -13 457 769, 3 465 043, -515 739, 44 649, -2091, 41}
```

```
-27 836 370
```

```
{0, 152 389, 2 438 199, 29 410 745, 316 965 325, 0, 0, 2 198 761 371 082}.
 Transpose[{{-587 601, 690 339, -331 089, 84 763, -12 587, 1089, -51, 1},
   {-548 793, 671 411, -327 665, 84 491, -12 579, 1089, -51, 1},
   {-559 881, 675 235, -328 097, 84 507, -12 579, 1089, -51, 1},
   {-557 865, 674 723, -328 065, 84 507, -12 579, 1089, -51, 1},
   {-566 937, 678 035, -328 465, 84 523, -12 579, 1089, -51, 1},
   {-521 073, 656 307, -324 673, 84 235, -12 571, 1089, -51, 1},
   {-519 057, 655 795, -324 641, 84 235, -12 571, 1089, -51, 1},
   {-530 145, 659 619, -325 073, 84 251, -12 571, 1089, -51, 1},
   {-528 129, 659 107, -325 041, 84 251, -12 571, 1089, -51, 1},
   {-526 113, 658 595, -325 009, 84 251, -12 571, 1089, -51, 1},
   {-539 217, 662 931, -325 473, 84 267, -12 571, 1089, -51, 1},
   {-537 201, 662 419, -325 441, 84 267, -12 571, 1089, -51, 1},
   {-546 273, 665 731, -325 841, 84 283, -12 571, 1089, -51, 1},
   {-482 265, 637 379, -321 249, 83 963, -12 563, 1089, -51, 1},
   {-480 249, 636 867, -321 217, 83 963, -12 563, 1089, -51, 1},
   {-489 321, 640 179, -321 617, 83 979, -12 563, 1089, -51, 1},
   {-487 305, 639 667, -321 585, 83 979, -12 563, 1089, -51, 1},
   {-498 393, 643 491, -322 017, 83 995, -12 563, 1089, -51, 1},
   {-496 377, 642 979, -321 985, 83 995, -12 563, 1089, -51, 1},
   {-505 449, 646 291, -322 385, 84 011, -12 563, 1089, -51, 1},
   {-457 569, 624 051, -318 561, 83 723, -12 555, 1089, -51, 1},
   {-455 553, 623 539, -318 529, 83 723, -12 555, 1089, -51, 1},
   {-464 625, 626 851, -318 929, 83 739, -12 555, 1089, -51, 1},
   {-425 817, 607 923, -315 505, 83 467, -12 547, 1089, -51, 1}}]
```

```
{1 004 902, 979 246, 984 734, 983 934, 988 622, 959 078, 958 278, 963 766,
 962 966, 962 166, 968 454, 967 654, 972 342, 933 422, 932 622, 937 310,
 936 510, 941 998, 941 198, 945 886, 915 542, 914 742, 919 430, 893 774}
```

```
poly14 = listmod128[[14]]
```

$$(-9+x)^4\,(-7+x)^6\,(5+x)^{25}\,\left(59-16\,x+x^2\right)^2\,\left(52-15\,x+x^2\right)$$

```
p14 = poly14 / minipoly[poly14] // Factor
```

$$(-9+x)^3\,(-7+x)^5\,(5+x)^{24}\,\left(59-16\,x+x^2\right)$$

```
feasiblesubcharpolylist[(-9 + x)^4 (-7 + x)^6 (5 + x)^25 (59 - 16 x + x^2)^2 (52 - 15 x + x^2)]
```

```
{(-9 + x) (59 - 16 x + x^2) (-127 + 87 x - 17 x^2 + x^3),
 (-9 + x) (-7 + x) (59 - 16 x + x^2) (17 - 10 x + x^2)}
```

```
CoefficientList[{(-9 + x) (59 - 16 x + x^2) (-127 + 87 x - 17 x^2 + x^3),
  (-9 + x) (-7 + x) (59 - 16 x + x^2) (17 - 10 x + x^2)}, x]
```

```
{{67437, -71978, 29863, -6284, 715, -42, 1},
 {63189, -70354, 29663, -6276, 715, -42, 1}}
```

```
CoefficientList[D[poly14, x] / p14 // Factor, x]
```

```
{2771285, -2952858, 1224511, -257644, 29315, -1722, 41}
```

```
A = {{67437, -71978, 29863, -6284, 715, -42, 1},
   {63189, -70354, 29663, -6276, 715, -42, 1}};
```

```
Solve[Array[n, 2].{{67437, -71978, 29863, -6284, 715, -42, 1},
    {63189, -70354, 29663, -6276, 715, -42, 1}} ==
  {2771285, -2952858, 1224511, -257644, 29315, -1722, 41}, Array[n, 2]]
```

```
{}
```

```
Array[m, 7].Transpose[A]
```

```
{67437 m[1] - 71978 m[2] + 29863 m[3] - 6284 m[4] + 715 m[5] - 42 m[6] + m[7],
 63189 m[1] - 70354 m[2] + 29663 m[3] - 6276 m[4] + 715 m[5] - 42 m[6] + m[7]}
```

```
Array[m, 7].{2771285, -2952858, 1224511, -257644, 29315, -1722, 41}
```

```
2771285 m[1] - 2952858 m[2] + 1224511 m[3] -
 257644 m[4] + 29315 m[5] - 1722 m[6] + 41 m[7]
```

```
FindInstance[
 67437 m[1] - 71978 m[2] + 29863 m[3] - 6284 m[4] + 715 m[5] - 42 m[6] + m[7] ≥ 0 &&
  63189 m[1] - 70354 m[2] + 29663 m[3] - 6276 m[4] + 715 m[5] - 42 m[6] + m[7] ≥ 0 &&
  2771285 m[1] - 2952858 m[2] + 1224511 m[3] - 257644 m[4] +
    29315 m[5] - 1722 m[6] + 41 m[7] < 0, Array[m, 7], Integers]
```

```
{{m[1] → 0, m[2] → 3, m[3] → -56453,
  m[4] → -889825, m[5] → 0, m[6] → 0, m[7] → -3905464984}}
```

```
Array[m, 7] /. {m[1] → 0, m[2] → 3, m[3] → -56453,
  m[4] → -889825, m[5] → 0, m[6] → 0, m[7] → -3905464984}
```

```
{0, 3, -56453, -889825, 0, 0, -3905464984}
```

```
GCD[0, 3, -56453, -889825, 0, 0, -3905464984]
```

```
1
```

```
{0, 3, -56453, -889825, 0, 0, -3905464984}.
 {2771285, -2952858, 1224511, -257644, 29315, -1722, 41}
```

```
-2170101
```

```
{0, 3, -56 453, -889 825, 0, 0, -3 905 464 984}.
 Transpose[{{67 437, -71 978, 29 863, -6284, 715, -42, 1},
   {63 189, -70 354, 29 663, -6276, 715, -42, 1}}]
```

$$\{123\,443,\ 4\,300\,315\}$$

```
poly15 = listmod128[[15]]
```

$$(-9+x)^5\,(-8+x)\,(-7+x)^7\,(5+x)^{25}\,\left(-349+163\,x-23\,x^2+x^3\right)$$

```
p15 = poly15 / minipoly[poly15] // Factor
```

$$(-9+x)^4\,(-7+x)^6\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-9 + x)^5 (-8 + x) (-7 + x)^7 (5 + x)^25 (-349 + 163 x - 23 x^2 + x^3)]
```

$$\{(-9+x)\,(-7+x)\,(-3+x)\,\left(-349+163\,x-23\,x^2+x^3\right),$$
$$(-7+x)\,\left(-8807+8445\,x-2918\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)\,(-7+x)\,\left(991-830\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)\,(-7+x)\,\left(1007-830\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-7+x)\,\left(-8159+8301\,x-2910\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-11+x)\,(-9+x)\,(-7+x)\,(-5+x)\,\left(17-10\,x+x^2\right),$$
$$(-7+x)\,\left(-7655+8173\,x-2902\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)\,(-7+x)\,\left(879-814\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)\,(-7+x)\,\left(807-806\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-7+x)^2\,\left(929-996\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)\,(-7+x)\,\left(751-798\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)\,(-7+x)^2\,\left(-89+99\,x-19\,x^2+x^3\right)\}$$

```
{(-9 + x) (-7 + x) (-3 + x) (-349 + 163 x - 23 x^2 + x^3),
  (-7 + x) (-8807 + 8445 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (991 - 830 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (1007 - 830 x + 232 x^2 - 26 x^3 + x^4),
  (-7 + x) (-8159 + 8301 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-11 + x) (-9 + x) (-7 + x) (-5 + x) (17 - 10 x + x^2),
  (-7 + x) (-7655 + 8173 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-7 + x)^2 (929 - 996 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (751 - 798 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (-89 + 99 x - 19 x^2 + x^3)} // Length
```

12

```
CoefficientList[{(-9 + x) (-7 + x) (-3 + x) (-349 + 163 x - 23 x^2 + x^3),
  (-7 + x) (-8807 + 8445 x - 2918 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (991 - 830 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (1007 - 830 x + 232 x^2 - 26 x^3 + x^4),
  (-7 + x) (-8159 + 8301 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-11 + x) (-9 + x) (-7 + x) (-5 + x) (17 - 10 x + x^2),
  (-7 + x) (-7655 + 8173 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-7 + x)^2 (929 - 996 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (751 - 798 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x)^2 (-89 + 99 x - 19 x^2 + x^3)}, x]
```

```
{{65961, -69546, 29071, -6188, 711, -42, 1},
 {61649, -67922, 28871, -6180, 711, -42, 1},
 {62433, -68146, 28887, -6180, 711, -42, 1},
 {63441, -68402, 28903, -6180, 711, -42, 1},
 {57113, -66266, 28671, -6172, 711, -42, 1},
 {58905, -66746, 28703, -6172, 711, -42, 1},
 {53585, -64866, 28487, -6164, 711, -42, 1},
 {55377, -65346, 28519, -6164, 711, -42, 1},
 {50841, -63690, 28319, -6156, 711, -42, 1},
 {45521, -61810, 28103, -6148, 711, -42, 1},
 {47313, -62290, 28135, -6148, 711, -42, 1},
 {39249, -59234, 27751, -6132, 711, -42, 1}}
```

```
A = {{65961, -69546, 29071, -6188, 711, -42, 1},
   {61649, -67922, 28871, -6180, 711, -42, 1},
   {62433, -68146, 28887, -6180, 711, -42, 1}, {63441, -68402, 28903,
    -6180, 711, -42, 1}, {57113, -66266, 28671, -6172, 711, -42, 1},
   {58905, -66746, 28703, -6172, 711, -42, 1}, {53585, -64866, 28487,
    -6164, 711, -42, 1}, {55377, -65346, 28519, -6164, 711, -42, 1},
   {50841, -63690, 28319, -6156, 711, -42, 1}, {45521, -61810, 28103,
    -6148, 711, -42, 1}, {47313, -62290, 28135, -6148, 711, -42, 1},
   {39249, -59234, 27751, -6132, 711, -42, 1}};
```

```
MatrixRank[A]
```

```
4
```

```
CoefficientList[D[poly15, x] / p15 // Factor, x]
```

```
{2508625, -2769690, 1180903, -253228, 29151, -1722, 41}
```

```
Solve[
 Array[n, 12].{{65 961, -69 546, 29 071, -6188, 711, -42, 1}, {61 649, -67 922, 28 871,
     -6180, 711, -42, 1}, {62 433, -68 146, 28 887, -6180, 711, -42, 1},
    {63 441, -68 402, 28 903, -6180, 711, -42, 1}, {57 113, -66 266, 28 671,
     -6172, 711, -42, 1}, {58 905, -66 746, 28 703, -6172, 711, -42, 1},
    {53 585, -64 866, 28 487, -6164, 711, -42, 1}, {55 377, -65 346, 28 519,
     -6164, 711, -42, 1}, {50 841, -63 690, 28 319, -6156, 711, -42, 1},
    {45 521, -61 810, 28 103, -6148, 711, -42, 1}, {47 313, -62 290, 28 135,
     -6148, 711, -42, 1}, {39 249, -59 234, 27 751, -6132, 711, -42, 1}} ==
  {2 508 625, -2 769 690, 1 180 903, -253 228, 29 151, -1722, 41}, Array[n, 12]]
```

```
{}
```

```
Array[m, 7].Transpose[A]
```

```
{65 961 m[1] - 69 546 m[2] + 29 071 m[3] - 6188 m[4] + 711 m[5] - 42 m[6] + m[7],
 61 649 m[1] - 67 922 m[2] + 28 871 m[3] - 6180 m[4] + 711 m[5] - 42 m[6] + m[7],
 62 433 m[1] - 68 146 m[2] + 28 887 m[3] - 6180 m[4] + 711 m[5] - 42 m[6] + m[7],
 63 441 m[1] - 68 402 m[2] + 28 903 m[3] - 6180 m[4] + 711 m[5] - 42 m[6] + m[7],
 57 113 m[1] - 66 266 m[2] + 28 671 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7],
 58 905 m[1] - 66 746 m[2] + 28 703 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7],
 53 585 m[1] - 64 866 m[2] + 28 487 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 55 377 m[1] - 65 346 m[2] + 28 519 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 50 841 m[1] - 63 690 m[2] + 28 319 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7],
 45 521 m[1] - 61 810 m[2] + 28 103 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7],
 47 313 m[1] - 62 290 m[2] + 28 135 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7],
 39 249 m[1] - 59 234 m[2] + 27 751 m[3] - 6132 m[4] + 711 m[5] - 42 m[6] + m[7]}
```

```
Array[m, 7].{2 508 625, -2 769 690, 1 180 903, -253 228, 29 151, -1722, 41}
```

```
2 508 625 m[1] - 2 769 690 m[2] + 1 180 903 m[3] -
 253 228 m[4] + 29 151 m[5] - 1722 m[6] + 41 m[7]
```

```
FindInstance[
 65 961 m[1] - 69 546 m[2] + 29 071 m[3] - 6188 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  61 649 m[1] - 67 922 m[2] + 28 871 m[3] - 6180 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  62 433 m[1] - 68 146 m[2] + 28 887 m[3] - 6180 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  63 441 m[1] - 68 402 m[2] + 28 903 m[3] - 6180 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  57 113 m[1] - 66 266 m[2] + 28 671 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  58 905 m[1] - 66 746 m[2] + 28 703 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  53 585 m[1] - 64 866 m[2] + 28 487 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  55 377 m[1] - 65 346 m[2] + 28 519 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  50 841 m[1] - 63 690 m[2] + 28 319 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  45 521 m[1] - 61 810 m[2] + 28 103 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  47 313 m[1] - 62 290 m[2] + 28 135 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  39 249 m[1] - 59 234 m[2] + 27 751 m[3] - 6132 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  2 508 625 m[1] - 2 769 690 m[2] + 1 180 903 m[3] - 253 228 m[4] +
    29 151 m[5] - 1722 m[6] + 41 m[7] < 0, Array[m, 7], Integers]
```

```
{{m[1] → -8404, m[2] → -28 265, m[3] → -48 443, m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0}}
```

```
Array[m, 7] /.
 {m[1] → -8404, m[2] → -28 265, m[3] → -48 443, m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0}
```

```
{-8404, -28 265, -48 443, 0, 0, 0, 0}
```

```
GCD[-8404, -28 265, -48 443, 0, 0, 0, 0]
```

```
1
```

```
{-8404, -28 265, -48 443, 0, 0, 0, 0}.
 {2 508 625, -2 769 690, 1 180 903, -253 228, 29 151, -1722, 41}
```

```
-3 680 679
```

```
{-8404, -28 265, -48 443, 0, 0, 0, 0}.
 Transpose[{{65 961, -69 546, 29 071, -6188, 711, -42, 1}, {61 649, -67 922,
    28 871, -6180, 711, -42, 1}, {62 433, -68 146, 28 887, -6180, 711, -42, 1},
   {63 441, -68 402, 28 903, -6180, 711, -42, 1}, {57 113, -66 266, 28 671,
    -6172, 711, -42, 1}, {58 905, -66 746, 28 703, -6172, 711, -42, 1},
   {53 585, -64 866, 28 487, -6164, 711, -42, 1}, {55 377, -65 346, 28 519,
    -6164, 711, -42, 1}, {50 841, -63 690, 28 319, -6156, 711, -42, 1},
   {45 521, -61 810, 28 103, -6148, 711, -42, 1}, {47 313, -62 290, 28 135,
    -6148, 711, -42, 1}, {39 249, -59 234, 27 751, -6132, 711, -42, 1}}]
```

```
{3 094 993, 3 119 281, 2 086 817, 76 337, 4 121 585,
 1 078 641, 3 113 409, 70 465, 1 072 769, 3 107 537, 64 593, 58 721}
```

```
poly16 = listmod128[[16]]
```

$$(-11+x)\,(-9+x)^6\,(-8+x)\,(-7+x)^6\,(-5+x)^2\,(5+x)^{25}$$

```
p16 = poly16 / minipoly[poly16] // Factor
```

$$(-9+x)^5\,(-7+x)^5\,(-5+x)\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-11 + x) (-9 + x)^6 (-8 + x) (-7 + x)^6 (-5 + x)^2 (5 + x)^25]
```

$$\{(-11+x)\,(-9+x)\,(-7+x)\,(-5+x)\,(-3+x),$$
$$(-11+x)\,(-7+x)\,\left(-127+87\,x-17\,x^2+x^3\right),\ -9923+9001\,x-3002\,x^2+470\,x^3-35\,x^4+x^5,$$
$$(-9+x)\,(-7+x)\,\left(-157+103\,x-19\,x^2+x^3\right),\ (-9+x)\,(-5+x)\,\left(-223+131\,x-21\,x^2+x^3\right),$$
$$(-7+x)\,\left(1325-1076\,x+274\,x^2-28\,x^3+x^4\right),\ (-9+x)\,(-7+x)\,\left(-149+103\,x-19\,x^2+x^3\right),$$
$$(-9+x)\,\left(1059-870\,x+236\,x^2-26\,x^3+x^4\right),\ (-7+x)^2\,\left(-179+127\,x-21\,x^2+x^3\right),$$
$$(-9+x)\,(-7+x)\,\left(-141+103\,x-19\,x^2+x^3\right),\ (-9+x)\,\left(59-16\,x+x^2\right)\left(17-10\,x+x^2\right),$$
$$(-9+x)\,(-7+x)^2\,\left(19-12\,x+x^2\right),\ (-9+x)\,(-7+x)\,\left(-125+103\,x-19\,x^2+x^3\right)\}$$

```
{(-11 + x) (-9 + x) (-7 + x) (-5 + x) (-3 + x), (-11 + x) (-7 + x) (-127 + 87 x - 17 x^2 + x^3),
  -9923 + 9001 x - 3002 x^2 + 470 x^3 - 35 x^4 + x^5, (-9 + x) (-7 + x) (-157 + 103 x - 19 x^2 + x^3),
  (-9 + x) (-5 + x) (-223 + 131 x - 21 x^2 + x^3), (-7 + x) (1325 - 1076 x + 274 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (-149 + 103 x - 19 x^2 + x^3), (-9 + x) (1059 - 870 x + 236 x^2 - 26 x^3 + x^4),
  (-7 + x)^2 (-179 + 127 x - 21 x^2 + x^3), (-9 + x) (-7 + x) (-141 + 103 x - 19 x^2 + x^3),
  (-9 + x) (59 - 16 x + x^2) (17 - 10 x + x^2), (-9 + x) (-7 + x)^2 (19 - 12 x + x^2),
  (-9 + x) (-7 + x) (-125 + 103 x - 19 x^2 + x^3)} // Length
```

```
13
```

```
CoefficientList[{(-11 + x) (-9 + x) (-7 + x) (-5 + x) (-3 + x),
  (-11 + x) (-7 + x) (-127 + 87 x - 17 x^2 + x^3), -9923 + 9001 x - 3002 x^2 + 470 x^3 - 35 x^4 + x^5,
  (-9 + x) (-7 + x) (-157 + 103 x - 19 x^2 + x^3), (-9 + x) (-5 + x) (-223 + 131 x - 21 x^2 + x^3),
  (-7 + x) (1325 - 1076 x + 274 x^2 - 28 x^3 + x^4), (-9 + x) (-7 + x) (-149 + 103 x - 19 x^2 + x^3),
  (-9 + x) (1059 - 870 x + 236 x^2 - 26 x^3 + x^4), (-7 + x)^2 (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x) (-7 + x) (-141 + 103 x - 19 x^2 + x^3), (-9 + x) (59 - 16 x + x^2) (17 - 10 x + x^2),
  (-9 + x) (-7 + x)^2 (19 - 12 x + x^2), (-9 + x) (-7 + x) (-125 + 103 x - 19 x^2 + x^3)}, x]
```

```
{{-10 395, 9129, -3010, 470, -35, 1},
 {-9779, 8985, -3002, 470, -35, 1}, {-9923, 9001, -3002, 470, -35, 1},
 {-9891, 9001, -3002, 470, -35, 1}, {-10 035, 9017, -3002, 470, -35, 1},
 {-9275, 8857, -2994, 470, -35, 1}, {-9387, 8873, -2994, 470, -35, 1},
 {-9531, 8889, -2994, 470, -35, 1}, {-8771, 8729, -2986, 470, -35, 1},
 {-8883, 8745, -2986, 470, -35, 1}, {-9027, 8761, -2986, 470, -35, 1},
 {-8379, 8617, -2978, 470, -35, 1}, {-7875, 8489, -2970, 470, -35, 1}}
```

```
A = {{-10 395, 9129, -3010, 470, -35, 1},
    {-9779, 8985, -3002, 470, -35, 1}, {-9923, 9001, -3002, 470, -35, 1},
    {-9891, 9001, -3002, 470, -35, 1}, {-10 035, 9017, -3002, 470, -35, 1},
    {-9275, 8857, -2994, 470, -35, 1}, {-9387, 8873, -2994, 470, -35, 1},
    {-9531, 8889, -2994, 470, -35, 1}, {-8771, 8729, -2986, 470, -35, 1},
    {-8883, 8745, -2986, 470, -35, 1}, {-9027, 8761, -2986, 470, -35, 1},
    {-8379, 8617, -2978, 470, -35, 1}, {-7875, 8489, -2970, 470, -35, 1}};
```

```
CoefficientList[D[poly16, x] / p16 // Factor, x]
```

```
{-396 435, 366 513, -122 930, 19 270, -1435, 41}
```

```
Solve[Array[n, 13].{{-10 395, 9129, -3010, 470, -35, 1},
    {-9779, 8985, -3002, 470, -35, 1}, {-9923, 9001, -3002, 470, -35, 1},
    {-9891, 9001, -3002, 470, -35, 1}, {-10 035, 9017, -3002, 470, -35, 1},
    {-9275, 8857, -2994, 470, -35, 1}, {-9387, 8873, -2994, 470, -35, 1},
    {-9531, 8889, -2994, 470, -35, 1}, {-8771, 8729, -2986, 470, -35, 1},
    {-8883, 8745, -2986, 470, -35, 1}, {-9027, 8761, -2986, 470, -35, 1},
    {-8379, 8617, -2978, 470, -35, 1}, {-7875, 8489, -2970, 470, -35, 1}} ==
  {-396 435, 366 513, -122 930, 19 270, -1435, 41}, Array[n, 13]]
```

Solve::svars : Equations may not give solutions for all "solve" variables. ≫

$$\{\{n[9] \to 42 - n[2] - n[3] - n[6],\ n[11] \to 36 - n[3] - n[5] - n[8],\ n[12] \to -11 - 5\,n[1] - 2\,n[2] - 4\,n[4] - 2\,n[5] - n[6] - 3\,n[7] - n[8] - 2\,n[10],\ n[13] \to -26 + 4\,n[1] + 2\,n[2] + n[3] + 3\,n[4] + 2\,n[5] + n[6] + 2\,n[7] + n[8] + n[10]\}\}$$

```
FindInstance[-n[9] + 42 - n[2] - n[3] - n[6] == 0 &&
  -n[11] + 36 - n[3] - n[5] - n[8] == 0 &&
  -n[12] - 11 - 5 n[1] - 2 n[2] - 4 n[4] - 2 n[5] - n[6] - 3 n[7] - n[8] - 2 n[10] == 0 &&
  -n[13] - 26 + 4 n[1] + 2 n[2] + n[3] + 3 n[4] + 2 n[5] + n[6] + 2 n[7] + n[8] + n[10] == 0 &&
  n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 &&
  n[6] ≥ 0 && n[7] ≥ 0 && n[8] ≥ 0 && n[9] ≥ 0 && n[10] ≥ 0 &&
  n[11] ≥ 0 && n[12] ≥ 0 && n[13] ≥ 0, Array[n, 13], Integers]
```

$$\{\}$$

```
Array[m, 6].Transpose[A]
```

$$\{-10\,395\,m[1] + 9129\,m[2] - 3010\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -9779\,m[1] + 8985\,m[2] - 3002\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -9923\,m[1] + 9001\,m[2] - 3002\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -9891\,m[1] + 9001\,m[2] - 3002\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -10\,035\,m[1] + 9017\,m[2] - 3002\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -9275\,m[1] + 8857\,m[2] - 2994\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -9387\,m[1] + 8873\,m[2] - 2994\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -9531\,m[1] + 8889\,m[2] - 2994\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -8771\,m[1] + 8729\,m[2] - 2986\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -8883\,m[1] + 8745\,m[2] - 2986\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -9027\,m[1] + 8761\,m[2] - 2986\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -8379\,m[1] + 8617\,m[2] - 2978\,m[3] + 470\,m[4] - 35\,m[5] + m[6],\ -7875\,m[1] + 8489\,m[2] - 2970\,m[3] + 470\,m[4] - 35\,m[5] + m[6]\}$$

```
Array[m, 6].{-396 435, 366 513, -122 930, 19 270, -1435, 41}
```

$$-396\,435\,m[1] + 366\,513\,m[2] - 122\,930\,m[3] + 19\,270\,m[4] - 1435\,m[5] + 41\,m[6]$$

```
FindInstance[-10395 m[1] + 9129 m[2] - 3010 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9779 m[1] + 8985 m[2] - 3002 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9923 m[1] + 9001 m[2] - 3002 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9891 m[1] + 9001 m[2] - 3002 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -10035 m[1] + 9017 m[2] - 3002 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9275 m[1] + 8857 m[2] - 2994 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9387 m[1] + 8873 m[2] - 2994 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9531 m[1] + 8889 m[2] - 2994 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8771 m[1] + 8729 m[2] - 2986 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8883 m[1] + 8745 m[2] - 2986 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -9027 m[1] + 8761 m[2] - 2986 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -8379 m[1] + 8617 m[2] - 2978 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -7875 m[1] + 8489 m[2] - 2970 m[3] + 470 m[4] - 35 m[5] + m[6] ≥ 0 &&
  -396435 m[1] + 366513 m[2] - 122930 m[3] + 19270 m[4] - 1435 m[5] + 41 m[6] < 0,
 Array[m, 6], Integers]
```

```
{{m[1] → 10302, m[2] → 82421, m[3] → 659363, m[4] → 0, m[5] → 0, m[6] → 1339775890}}
```

```
Array[m, 6] /.
 {m[1] → 10302, m[2] → 82421, m[3] → 659363, m[4] → 0, m[5] → 0, m[6] → 1339775890}
```

```
{10302, 82421, 659363, 0, 0, 1339775890}
```

```
GCD[10302, 82421, 659363, 0, 0, 1339775890]
```

```
1
```

```
{10302, 82421, 659363, 0, 0, 1339775890}.
 {-396435, 366513, -122930, 19270, -1435, 41}
```

```
-387497
```

```
{10302, 82421, 659363, 0, 0, 1339775890}.
 Transpose[{{-10395, 9129, -3010, 470, -35, 1},
   {-9779, 8985, -3002, 470, -35, 1}, {-9923, 9001, -3002, 470, -35, 1},
   {-9891, 9001, -3002, 470, -35, 1}, {-10035, 9017, -3002, 470, -35, 1},
   {-9275, 8857, -2994, 470, -35, 1}, {-9387, 8873, -2994, 470, -35, 1},
   {-9531, 8889, -2994, 470, -35, 1}, {-8771, 8729, -2986, 470, -35, 1},
   {-8883, 8745, -2986, 470, -35, 1}, {-9027, 8761, -2986, 470, -35, 1},
   {-8379, 8617, -2978, 470, -35, 1}, {-7875, 8489, -2970, 470, -35, 1}}]
```

```
{425279, 177591, 12839, 342503, 177751, 94815,
 259727, 94975, 12039, 176951, 12199, 94175, 11399}
```

```
poly17 = listmod128[[17]]
```

```
(-9 + x)^5 (-7 + x)^7 (5 + x)^25 (2824 - 1653 x + 347 x^2 - 31 x^3 + x^4)
```

```
p17 = poly17 / minipoly[poly17] // Factor
```

$$(-9+x)^4\,(-7+x)^6\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-9 + x)^5 (-7 + x)^7 (5 + x)^25 (2824 - 1653 x + 347 x^2 - 31 x^3 + x^4)]
```

$$\{(-7+x)\left(-8527+8349\,x-2910\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$59\,401-66\,938\,x+28\,719\,x^2-6172\,x^3+711\,x^4-42\,x^5+x^6,$$
$$(-9+x)\left(-6737+6721\,x-2446\,x^2+414\,x^3-33\,x^4+x^5\right),$$
$$(-7+x)\left(23-12\,x+x^2\right)\left(-377+167\,x-23\,x^2+x^3\right),$$
$$(-9+x)\left(-6817+6737\,x-2446\,x^2+414\,x^3-33\,x^4+x^5\right),$$
$$(-7+x)^2\left(1105-1012\,x+270\,x^2-28\,x^3+x^4\right),$$
$$(-9+x)(-7+x)\left(879-814\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-7+x)\left(-7879+8205\,x-2902\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)(-7+x)(-5+x)\left(-179+127\,x-21\,x^2+x^3\right),$$
$$(-9+x)\left(-6233+6593\,x-2438\,x^2+414\,x^3-33\,x^4+x^5\right),$$
$$(-7+x)\left(-8023+8221\,x-2902\,x^2+466\,x^3-35\,x^4+x^5\right),$$
$$(-9+x)(-7+x)\left(911-814\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)^2(-5+x)\left(-141+103\,x-19\,x^2+x^3\right),\ (-9+x)^2(-7+x)\left(-103+79\,x-17\,x^2+x^3\right),$$
$$(-9+x)\left(-6457+6625\,x-2438\,x^2+414\,x^3-33\,x^4+x^5\right),$$
$$(-9+x)(-7+x)\left(807-806\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)(-7+x)\left(823-806\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)(-7+x)\left(839-806\,x+232\,x^2-26\,x^3+x^4\right),$$
$$(-9+x)^2\left(59-16\,x+x^2\right)\left(11-8\,x+x^2\right),\ (-9+x)^2(-7+x)(-5+x)\left(19-12\,x+x^2\right),$$
$$(-9+x)(-7+x)\left(59-16\,x+x^2\right)\left(13-10\,x+x^2\right),$$
$$(-9+x)^2(-7+x)\left(-87+79\,x-17\,x^2+x^3\right),\ (-9+x)^2(-7+x)\left(-79+79\,x-17\,x^2+x^3\right)\}$$

```
{(-7 + x) (-8527 + 8349 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  59401 - 66938 x + 28719 x^2 - 6172 x^3 + 711 x^4 - 42 x^5 + x^6,
  (-9 + x) (-6737 + 6721 x - 2446 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-7 + x) (23 - 12 x + x^2) (-377 + 167 x - 23 x^2 + x^3),
  (-9 + x) (-6817 + 6737 x - 2446 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-7 + x)^2 (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-7 + x) (-7879 + 8205 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-5 + x) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x) (-6233 + 6593 x - 2438 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-7 + x) (-8023 + 8221 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (911 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (-5 + x) (-141 + 103 x - 19 x^2 + x^3), (-9 + x)^2 (-7 + x) (-103 + 79 x - 17 x^2 + x^3),
  (-9 + x) (-6457 + 6625 x - 2438 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-9 + x) (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (823 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (839 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (59 - 16 x + x^2) (11 - 8 x + x^2), (-9 + x)^2 (-7 + x) (-5 + x) (19 - 12 x + x^2),
  (-9 + x) (-7 + x) (59 - 16 x + x^2) (13 - 10 x + x^2),
  (-9 + x)^2 (-7 + x) (-87 + 79 x - 17 x^2 + x^3),
  (-9 + x)^2 (-7 + x) (-79 + 79 x - 17 x^2 + x^3)} // Length
```

```
23
```

```
CoefficientList[{(-7 + x) (-8527 + 8349 x - 2910 x^2 + 466 x^3 - 35 x^4 + x^5),
  59401 - 66938 x + 28719 x^2 - 6172 x^3 + 711 x^4 - 42 x^5 + x^6,
  (-9 + x) (-6737 + 6721 x - 2446 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-7 + x) (23 - 12 x + x^2) (-377 + 167 x - 23 x^2 + x^3),
  (-9 + x) (-6817 + 6737 x - 2446 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-7 + x)^2 (1105 - 1012 x + 270 x^2 - 28 x^3 + x^4),
  (-9 + x) (-7 + x) (879 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-7 + x) (-7879 + 8205 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (-5 + x) (-179 + 127 x - 21 x^2 + x^3),
  (-9 + x) (-6233 + 6593 x - 2438 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-7 + x) (-8023 + 8221 x - 2902 x^2 + 466 x^3 - 35 x^4 + x^5),
  (-9 + x) (-7 + x) (911 - 814 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (-5 + x) (-141 + 103 x - 19 x^2 + x^3), (-9 + x)^2 (-7 + x) (-103 + 79 x - 17 x^2 + x^3),
  (-9 + x) (-6457 + 6625 x - 2438 x^2 + 414 x^3 - 33 x^4 + x^5),
  (-9 + x) (-7 + x) (807 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (823 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x) (-7 + x) (839 - 806 x + 232 x^2 - 26 x^3 + x^4),
  (-9 + x)^2 (59 - 16 x + x^2) (11 - 8 x + x^2), (-9 + x)^2 (-7 + x) (-5 + x) (19 - 12 x + x^2),
  (-9 + x) (-7 + x) (59 - 16 x + x^2) (13 - 10 x + x^2),
  (-9 + x)^2 (-7 + x) (-87 + 79 x - 17 x^2 + x^3), (-9 + x)^2 (-7 + x) (-79 + 79 x - 17 x^2 + x^3)}, x]
```

```
{{59689, -66970, 28719, -6172, 711, -42, 1},
 {59401, -66938, 28719, -6172, 711, -42, 1},
 {60633, -67226, 28735, -6172, 711, -42, 1},
 {60697, -67226, 28735, -6172, 711, -42, 1},
 {61353, -67450, 28751, -6172, 711, -42, 1},
 {54145, -65058, 28503, -6164, 711, -42, 1},
 {55377, -65346, 28519, -6164, 711, -42, 1},
 {55153, -65314, 28519, -6164, 711, -42, 1},
 {56385, -65602, 28535, -6164, 711, -42, 1},
 {56097, -65570, 28535, -6164, 711, -42, 1},
 {56161, -65570, 28535, -6164, 711, -42, 1},
 {57393, -65858, 28551, -6164, 711, -42, 1},
 {57105, -65826, 28551, -6164, 711, -42, 1},
 {58401, -66114, 28567, -6164, 711, -42, 1},
 {58113, -66082, 28567, -6164, 711, -42, 1},
 {50841, -63690, 28319, -6156, 711, -42, 1},
 {51849, -63946, 28335, -6156, 711, -42, 1},
 {52857, -64202, 28351, -6156, 711, -42, 1},
 {52569, -64170, 28351, -6156, 711, -42, 1},
 {53865, -64458, 28367, -6156, 711, -42, 1},
 {48321, -62546, 28151, -6148, 711, -42, 1},
 {49329, -62802, 28167, -6148, 711, -42, 1},
 {44793, -61146, 27967, -6140, 711, -42, 1}}
```

```
A = {{59689, -66970, 28719, -6172, 711, -42, 1},
    {59401, -66938, 28719, -6172, 711, -42, 1},
    {60633, -67226, 28735, -6172, 711, -42, 1}, {60697, -67226, 28735,
     -6172, 711, -42, 1}, {61353, -67450, 28751, -6172, 711, -42, 1},
    {54145, -65058, 28503, -6164, 711, -42, 1}, {55377, -65346, 28519,
     -6164, 711, -42, 1}, {55153, -65314, 28519, -6164, 711, -42, 1},
    {56385, -65602, 28535, -6164, 711, -42, 1}, {56097, -65570, 28535,
     -6164, 711, -42, 1}, {56161, -65570, 28535, -6164, 711, -42, 1},
    {57393, -65858, 28551, -6164, 711, -42, 1}, {57105, -65826, 28551,
     -6164, 711, -42, 1}, {58401, -66114, 28567, -6164, 711, -42, 1},
    {58113, -66082, 28567, -6164, 711, -42, 1}, {50841, -63690, 28319,
     -6156, 711, -42, 1}, {51849, -63946, 28335, -6156, 711, -42, 1},
    {52857, -64202, 28351, -6156, 711, -42, 1}, {52569, -64170, 28351,
     -6156, 711, -42, 1}, {53865, -64458, 28367, -6156, 711, -42, 1},
    {48321, -62546, 28151, -6148, 711, -42, 1}, {49329, -62802, 28167,
     -6148, 711, -42, 1}, {44793, -61146, 27967, -6140, 711, -42, 1}};

CoefficientList[D[poly17, x] / p17 // Factor, x]

{2543345, -2783706, 1182087, -253228, 29151, -1722, 41}

Solve[
 Array[n, 23].{{59689, -66970, 28719, -6172, 711, -42, 1}, {59401, -66938, 28719,
     -6172, 711, -42, 1}, {60633, -67226, 28735, -6172, 711, -42, 1},
    {60697, -67226, 28735, -6172, 711, -42, 1}, {61353, -67450, 28751, -6172,
     711, -42, 1}, {54145, -65058, 28503, -6164, 711, -42, 1}, {55377, -65346,
     28519, -6164, 711, -42, 1}, {55153, -65314, 28519, -6164, 711, -42, 1},
    {56385, -65602, 28535, -6164, 711, -42, 1}, {56097, -65570, 28535,
     -6164, 711, -42, 1}, {56161, -65570, 28535, -6164, 711, -42, 1},
    {57393, -65858, 28551, -6164, 711, -42, 1}, {57105, -65826, 28551,
     -6164, 711, -42, 1}, {58401, -66114, 28567, -6164, 711, -42, 1},
    {58113, -66082, 28567, -6164, 711, -42, 1}, {50841, -63690, 28319,
     -6156, 711, -42, 1}, {51849, -63946, 28335, -6156, 711, -42, 1},
    {52857, -64202, 28351, -6156, 711, -42, 1}, {52569, -64170, 28351,
     -6156, 711, -42, 1}, {53865, -64458, 28367, -6156, 711, -42, 1},
    {48321, -62546, 28151, -6148, 711, -42, 1}, {49329, -62802, 28167,
     -6148, 711, -42, 1}, {44793, -61146, 27967, -6140, 711, -42, 1}} ==
  {2543345, -2783706, 1182087, -253228, 29151, -1722, 41}, Array[n, 23]]

Solve::svars : Equations may not give solutions for all "solve" variables. >>

{{n[11] → 35 - n[1] - n[2] - n[4] - n[6] - n[8],
  n[19] → 63 - n[2] - n[3] - 2 n[5] - n[10] - n[13] - n[15],
  n[21] → -23 - n[1] - n[3] + n[5] - 2 n[6] - 3 n[7] - n[8] -
    2 n[9] - n[10] - n[12] + n[15] - 3 n[16] - 2 n[17] - n[18],
  n[22] → -22 + n[2] - n[3] - n[4] - n[5] + 2 n[6] + n[8] - n[9] - 2 n[12] -
    n[13] - 3 n[14] - 2 n[15] + n[16] - n[18] - 2 n[20],
  n[23] → -12 + n[1] + 2 n[3] + n[4] + n[5] + 2 n[7] + 2 n[9] + n[10] +
    2 n[12] + n[13] + 2 n[14] + n[15] + n[16] + n[17] + n[18] + n[20]}}
```

```
FindInstance[-n[11] + 35 - n[1] - n[2] - n[4] - n[6] - n[8] == 0 &&
  -n[19] + 63 - n[2] - n[3] - 2 n[5] - n[10] - n[13] - n[15] == 0 &&
  -n[21] - 23 - n[1] - n[3] + n[5] - 2 n[6] - 3 n[7] -
    n[8] - 2 n[9] - n[10] - n[12] + n[15] - 3 n[16] - 2 n[17] - n[18] == 0 &&
  -n[22] - 22 + n[2] - n[3] - n[4] - n[5] + 2 n[6] + n[8] - n[9] -
    2 n[12] - n[13] - 3 n[14] - 2 n[15] + n[16] - n[18] - 2 n[20] == 0 &&
  -n[23] - 12 + n[1] + 2 n[3] + n[4] + n[5] + 2 n[7] + 2 n[9] + n[10] +
    2 n[12] + n[13] + 2 n[14] + n[15] + n[16] + n[17] + n[18] + n[20] == 0 &&
  n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 && n[7] ≥ 0 &&
  n[8] ≥ 0 && n[9] ≥ 0 && n[10] ≥ 0 && n[11] ≥ 0 && n[12] ≥ 0 && n[13] ≥ 0 &&
  n[14] ≥ 0 && n[15] ≥ 0 && n[16] ≥ 0 && n[17] ≥ 0 && n[18] ≥ 0 && n[19] ≥ 0 &&
  n[20] ≥ 0 && n[21] ≥ 0 && n[22] ≥ 0 && n[23] ≥ 0, Array[n, 23], Integers]
```

```
{}
```

```
Array[m, 7].Transpose[A]
```

```
{59 689 m[1] - 66 970 m[2] + 28 719 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7],
 59 401 m[1] - 66 938 m[2] + 28 719 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7],
 60 633 m[1] - 67 226 m[2] + 28 735 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7],
 60 697 m[1] - 67 226 m[2] + 28 735 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7],
 61 353 m[1] - 67 450 m[2] + 28 751 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7],
 54 145 m[1] - 65 058 m[2] + 28 503 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 55 377 m[1] - 65 346 m[2] + 28 519 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 55 153 m[1] - 65 314 m[2] + 28 519 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 56 385 m[1] - 65 602 m[2] + 28 535 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 56 097 m[1] - 65 570 m[2] + 28 535 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 56 161 m[1] - 65 570 m[2] + 28 535 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 57 393 m[1] - 65 858 m[2] + 28 551 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 57 105 m[1] - 65 826 m[2] + 28 551 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 58 401 m[1] - 66 114 m[2] + 28 567 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 58 113 m[1] - 66 082 m[2] + 28 567 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7],
 50 841 m[1] - 63 690 m[2] + 28 319 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7],
 51 849 m[1] - 63 946 m[2] + 28 335 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7],
 52 857 m[1] - 64 202 m[2] + 28 351 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7],
 52 569 m[1] - 64 170 m[2] + 28 351 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7],
 53 865 m[1] - 64 458 m[2] + 28 367 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7],
 48 321 m[1] - 62 546 m[2] + 28 151 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7],
 49 329 m[1] - 62 802 m[2] + 28 167 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7],
 44 793 m[1] - 61 146 m[2] + 27 967 m[3] - 6140 m[4] + 711 m[5] - 42 m[6] + m[7]}
```

```
Array[m, 7].{2 543 345, -2 783 706, 1 182 087, -253 228, 29 151, -1722, 41}
```

```
2 543 345 m[1] - 2 783 706 m[2] + 1 182 087 m[3] -
 253 228 m[4] + 29 151 m[5] - 1722 m[6] + 41 m[7]
```

```
FindInstance[
 59 689 m[1] - 66 970 m[2] + 28 719 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  59 401 m[1] - 66 938 m[2] + 28 719 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  60 633 m[1] - 67 226 m[2] + 28 735 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  60 697 m[1] - 67 226 m[2] + 28 735 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  61 353 m[1] - 67 450 m[2] + 28 751 m[3] - 6172 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  54 145 m[1] - 65 058 m[2] + 28 503 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  55 377 m[1] - 65 346 m[2] + 28 519 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  55 153 m[1] - 65 314 m[2] + 28 519 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  56 385 m[1] - 65 602 m[2] + 28 535 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  56 097 m[1] - 65 570 m[2] + 28 535 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  56 161 m[1] - 65 570 m[2] + 28 535 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  57 393 m[1] - 65 858 m[2] + 28 551 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  57 105 m[1] - 65 826 m[2] + 28 551 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  58 401 m[1] - 66 114 m[2] + 28 567 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  58 113 m[1] - 66 082 m[2] + 28 567 m[3] - 6164 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  50 841 m[1] - 63 690 m[2] + 28 319 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  51 849 m[1] - 63 946 m[2] + 28 335 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  52 857 m[1] - 64 202 m[2] + 28 351 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  52 569 m[1] - 64 170 m[2] + 28 351 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  53 865 m[1] - 64 458 m[2] + 28 367 m[3] - 6156 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  48 321 m[1] - 62 546 m[2] + 28 151 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  49 329 m[1] - 62 802 m[2] + 28 167 m[3] - 6148 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  44 793 m[1] - 61 146 m[2] + 27 967 m[3] - 6140 m[4] + 711 m[5] - 42 m[6] + m[7] ≥ 0 &&
  2 543 345 m[1] - 2 783 706 m[2] + 1 182 087 m[3] - 253 228 m[4] +
    29 151 m[5] - 1722 m[6] + 41 m[7] < 0, Array[m, 7], Integers]
```

```
{{m[1] → -603, m[2] → -549, m[3] → 0, m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0}}
```

```
Array[m, 7] /.
 {m[1] → -603, m[2] → -549, m[3] → 0, m[4] → 0, m[5] → 0, m[6] → 0, m[7] → 0}
```

```
{-603, -549, 0, 0, 0, 0, 0}
```

```
GCD[-603, -549, 0, 0, 0, 0, 0]
```

```
9
```

```
{-603, -549, 0, 0, 0, 0, 0} / 9
```

```
{-67, -61, 0, 0, 0, 0, 0}
```

```
{-67, -61, 0, 0, 0, 0, 0}.{2 543 345, -2 783 706, 1 182 087, -253 228, 29 151, -1722, 41}
```

```
-598 049
```

```
{-67, -61, 0, 0, 0, 0, 0}.
 Transpose[{{59689, -66970, 28719, -6172, 711, -42, 1}, {59401, -66938,
    28719, -6172, 711, -42, 1}, {60633, -67226, 28735, -6172, 711, -42, 1},
   {60697, -67226, 28735, -6172, 711, -42, 1},
   {61353, -67450, 28751, -6172, 711, -42, 1},
   {54145, -65058, 28503, -6164, 711, -42, 1}, {55377, -65346, 28519,
    -6164, 711, -42, 1}, {55153, -65314, 28519, -6164, 711, -42, 1},
   {56385, -65602, 28535, -6164, 711, -42, 1}, {56097, -65570, 28535,
    -6164, 711, -42, 1}, {56161, -65570, 28535, -6164, 711, -42, 1},
   {57393, -65858, 28551, -6164, 711, -42, 1}, {57105, -65826, 28551,
    -6164, 711, -42, 1}, {58401, -66114, 28567, -6164, 711, -42, 1},
   {58113, -66082, 28567, -6164, 711, -42, 1}, {50841, -63690, 28319,
    -6156, 711, -42, 1}, {51849, -63946, 28335, -6156, 711, -42, 1},
   {52857, -64202, 28351, -6156, 711, -42, 1}, {52569, -64170, 28351,
    -6156, 711, -42, 1}, {53865, -64458, 28367, -6156, 711, -42, 1},
   {48321, -62546, 28151, -6148, 711, -42, 1}, {49329, -62802, 28167,
    -6148, 711, -42, 1}, {44793, -61146, 27967, -6140, 711, -42, 1}}]
{86007, 103351, 38375, 34087, 3799, 340823, 275847,
 288903, 223927, 241271, 236983, 172007, 189351, 120087, 137431,
 478743, 426823, 374903, 392247, 322983, 577799, 525879, 728775}

Length[{86007, 103351, 38375, 34087, 3799, 340823, 275847,
  288903, 223927, 241271, 236983, 172007, 189351, 120087, 137431,
  478743, 426823, 374903, 392247, 322983, 577799, 525879, 728775}]
23

{-603, -549, 0, 0, 0, 0, 0}.Transpose[A]
{774063, 930159, 345375, 306783, 34191, 3067407, 2482623, 2600127, 2015343,
 2171439, 2132847, 1548063, 1704159, 1080783, 1236879, 4308687,
 3841407, 3374127, 3530223, 2906847, 5200191, 4732911, 6558975}

{-603, -549, 0, 0, 0, 0, 0}.
 {2543345, -2783706, 1182087, -253228, 29151, -1722, 41}
-5382441

poly18 = listmod128[[18]]
(-11 + x) (-9 + x)^6 (-7 + x)^8 (-4 + x) (5 + x)^25

p18 = poly18 / minipoly[poly18]
(-9 + x)^5 (-7 + x)^7 (5 + x)^24
```

```
feasiblesubcharpolylist[(-11 + x) (-9 + x)^6 (-7 + x)^8 (-4 + x) (5 + x)^25]
```

$$\{(-11+x)(-5+x)\left(17-10x+x^2\right),\ 951-822x+232x^2-26x^3+x^4,$$
$$967-822x+232x^2-26x^3+x^4,\ 983-822x+232x^2-26x^3+x^4,$$
$$(-11+x)(-7+x)\left(11-8x+x^2\right),\ 863-814x+232x^2-26x^3+x^4,$$
$$879-814x+232x^2-26x^3+x^4,\ (-5+x)\left(-179+127x-21x^2+x^3\right),$$
$$911-814x+232x^2-26x^3+x^4,\ (-9+x)\left(-103+79x-17x^2+x^3\right),$$
$$(-7+x)\left(-113+99x-19x^2+x^3\right),\ 807-806x+232x^2-26x^3+x^4,$$
$$823-806x+232x^2-26x^3+x^4,\ 839-806x+232x^2-26x^3+x^4,$$
$$(-9+x)(-5+x)\left(19-12x+x^2\right),\ (-7+x)^2\left(15-12x+x^2\right),\ 751-798x+232x^2-26x^3+x^4,$$
$$\left(59-16x+x^2\right)\left(13-10x+x^2\right),\ (-9+x)\left(-87+79x-17x^2+x^3\right),$$
$$(-7+x)\left(-97+99x-19x^2+x^3\right),\ 695-790x+232x^2-26x^3+x^4,$$
$$(-9+x)\left(-79+79x-17x^2+x^3\right),\ (-7+x)\left(-89+99x-19x^2+x^3\right),$$
$$(-9+x)\left(-71+79x-17x^2+x^3\right),\ (-9+x)^2(-7+x)(-1+x)\}$$

```
{(-11 + x) (-5 + x) (17 - 10 x + x^2),
  951 - 822 x + 232 x^2 - 26 x^3 + x^4, 967 - 822 x + 232 x^2 - 26 x^3 + x^4,
  983 - 822 x + 232 x^2 - 26 x^3 + x^4, (-11 + x) (-7 + x) (11 - 8 x + x^2),
  863 - 814 x + 232 x^2 - 26 x^3 + x^4, 879 - 814 x + 232 x^2 - 26 x^3 + x^4,
  (-5 + x) (-179 + 127 x - 21 x^2 + x^3), 911 - 814 x + 232 x^2 - 26 x^3 + x^4,
  (-9 + x) (-103 + 79 x - 17 x^2 + x^3), (-7 + x) (-113 + 99 x - 19 x^2 + x^3),
  807 - 806 x + 232 x^2 - 26 x^3 + x^4, 823 - 806 x + 232 x^2 - 26 x^3 + x^4,
  839 - 806 x + 232 x^2 - 26 x^3 + x^4, (-9 + x) (-5 + x) (19 - 12 x + x^2),
  (-7 + x)^2 (15 - 12 x + x^2), 751 - 798 x + 232 x^2 - 26 x^3 + x^4,
  (59 - 16 x + x^2) (13 - 10 x + x^2), (-9 + x) (-87 + 79 x - 17 x^2 + x^3),
  (-7 + x) (-97 + 99 x - 19 x^2 + x^3), 695 - 790 x + 232 x^2 - 26 x^3 + x^4,
  (-9 + x) (-79 + 79 x - 17 x^2 + x^3), (-7 + x) (-89 + 99 x - 19 x^2 + x^3),
  (-9 + x) (-71 + 79 x - 17 x^2 + x^3), (-9 + x)^2 (-7 + x) (-1 + x)} // Length
```

```
25
```

```
CoefficientList[{(-11 + x) (-5 + x) (17 - 10 x + x^2),
  951 - 822 x + 232 x^2 - 26 x^3 + x^4, 967 - 822 x + 232 x^2 - 26 x^3 + x^4,
  983 - 822 x + 232 x^2 - 26 x^3 + x^4, (-11 + x) (-7 + x) (11 - 8 x + x^2),
  863 - 814 x + 232 x^2 - 26 x^3 + x^4, 879 - 814 x + 232 x^2 - 26 x^3 + x^4,
  (-5 + x) (-179 + 127 x - 21 x^2 + x^3), 911 - 814 x + 232 x^2 - 26 x^3 + x^4,
  (-9 + x) (-103 + 79 x - 17 x^2 + x^3), (-7 + x) (-113 + 99 x - 19 x^2 + x^3),
  807 - 806 x + 232 x^2 - 26 x^3 + x^4, 823 - 806 x + 232 x^2 - 26 x^3 + x^4,
  839 - 806 x + 232 x^2 - 26 x^3 + x^4, (-9 + x) (-5 + x) (19 - 12 x + x^2),
  (-7 + x)^2 (15 - 12 x + x^2), 751 - 798 x + 232 x^2 - 26 x^3 + x^4,
  (59 - 16 x + x^2) (13 - 10 x + x^2), (-9 + x) (-87 + 79 x - 17 x^2 + x^3),
  (-7 + x) (-97 + 99 x - 19 x^2 + x^3), 695 - 790 x + 232 x^2 - 26 x^3 + x^4,
  (-9 + x) (-79 + 79 x - 17 x^2 + x^3), (-7 + x) (-89 + 99 x - 19 x^2 + x^3),
  (-9 + x) (-71 + 79 x - 17 x^2 + x^3), (-9 + x)^2 (-7 + x) (-1 + x)}, x]
```

```
{{935, -822, 232, -26, 1}, {951, -822, 232, -26, 1},
 {967, -822, 232, -26, 1}, {983, -822, 232, -26, 1},
 {847, -814, 232, -26, 1}, {863, -814, 232, -26, 1}, {879, -814, 232, -26, 1},
 {895, -814, 232, -26, 1}, {911, -814, 232, -26, 1}, {927, -814, 232, -26, 1},
 {791, -806, 232, -26, 1}, {807, -806, 232, -26, 1}, {823, -806, 232, -26, 1},
 {839, -806, 232, -26, 1}, {855, -806, 232, -26, 1}, {735, -798, 232, -26, 1},
 {751, -798, 232, -26, 1}, {767, -798, 232, -26, 1}, {783, -798, 232, -26, 1},
 {679, -790, 232, -26, 1}, {695, -790, 232, -26, 1}, {711, -790, 232, -26, 1},
 {623, -782, 232, -26, 1}, {639, -782, 232, -26, 1}, {567, -774, 232, -26, 1}}
```

```
A = {{935, -822, 232, -26, 1}, {951, -822, 232, -26, 1},
    {967, -822, 232, -26, 1}, {983, -822, 232, -26, 1}, {847, -814, 232, -26, 1},
    {863, -814, 232, -26, 1}, {879, -814, 232, -26, 1}, {895, -814, 232, -26, 1},
    {911, -814, 232, -26, 1}, {927, -814, 232, -26, 1}, {791, -806, 232, -26, 1},
    {807, -806, 232, -26, 1}, {823, -806, 232, -26, 1}, {839, -806, 232, -26, 1},
    {855, -806, 232, -26, 1}, {735, -798, 232, -26, 1}, {751, -798, 232, -26, 1},
    {767, -798, 232, -26, 1}, {783, -798, 232, -26, 1}, {679, -790, 232, -26, 1},
    {695, -790, 232, -26, 1}, {711, -790, 232, -26, 1}, {623, -782, 232, -26, 1},
    {639, -782, 232, -26, 1}, {567, -774, 232, -26, 1}};
```

```
CoefficientList[D[poly18, x] / p18 // Factor, x]
```

```
{39 495, -33 726, 9512, -1066, 41}
```

```
Solve[Array[n, 25].{{935, -822, 232, -26, 1}, {951, -822, 232, -26, 1},
    {967, -822, 232, -26, 1}, {983, -822, 232, -26, 1}, {847, -814, 232, -26, 1},
    {863, -814, 232, -26, 1}, {879, -814, 232, -26, 1}, {895, -814, 232, -26, 1},
    {911, -814, 232, -26, 1}, {927, -814, 232, -26, 1}, {791, -806, 232, -26, 1},
    {807, -806, 232, -26, 1}, {823, -806, 232, -26, 1}, {839, -806, 232, -26, 1},
    {855, -806, 232, -26, 1}, {735, -798, 232, -26, 1}, {751, -798, 232, -26, 1},
    {767, -798, 232, -26, 1}, {783, -798, 232, -26, 1}, {679, -790, 232, -26, 1},
    {695, -790, 232, -26, 1}, {711, -790, 232, -26, 1}, {623, -782, 232, -26, 1},
    {639, -782, 232, -26, 1}, {567, -774, 232, -26, 1}} ==
  {39 495, -33 726, 9512, -1066, 41}, Array[n, 25]]
```

Solve::svars : Equations may not give solutions for all "solve" variables. ≫

```
{{n[23] → 105 - 4 n[1] - 3 n[2] - 2 n[3] - n[4] - 5 n[5] - 4 n[6] - 3 n[7] - 2 n[8] - n[9] -
     4 n[11] - 3 n[12] - 2 n[13] - n[14] - 3 n[16] - 2 n[17] - n[18] - 2 n[20] - n[21],
  n[24] → 144 - 2 n[1] - 3 n[2] - 4 n[3] - 5 n[4] - n[6] - 2 n[7] - 3 n[8] - 4 n[9] - 5 n[10] -
     n[12] - 2 n[13] - 3 n[14] - 4 n[15] - n[17] - 2 n[18] - 3 n[19] - n[21] - 2 n[22],
  n[25] → -208 + 5 n[1] + 5 n[2] + 5 n[3] + 5 n[4] + 4 n[5] + 4 n[6] + 4 n[7] +
     4 n[8] + 4 n[9] + 4 n[10] + 3 n[11] + 3 n[12] + 3 n[13] + 3 n[14] +
     3 n[15] + 2 n[16] + 2 n[17] + 2 n[18] + 2 n[19] + n[20] + n[21] + n[22]}}
```

```
FindInstance[
 -n[23] + 105 - 4 n[1] - 3 n[2] - 2 n[3] - n[4] - 5 n[5] - 4 n[6] - 3 n[7] - 2 n[8] - n[9] -
     4 n[11] - 3 n[12] - 2 n[13] - n[14] - 3 n[16] - 2 n[17] - n[18] - 2 n[20] - n[21] == 0 &&
  -n[24] + 144 - 2 n[1] - 3 n[2] - 4 n[3] - 5 n[4] - n[6] - 2 n[7] - 3 n[8] - 4 n[9] - 5 n[10] -
     n[12] - 2 n[13] - 3 n[14] - 4 n[15] - n[17] - 2 n[18] - 3 n[19] - n[21] - 2 n[22] == 0 &&
  -n[25] - 208 + 5 n[1] + 5 n[2] + 5 n[3] + 5 n[4] + 4 n[5] + 4 n[6] +
     4 n[7] + 4 n[8] + 4 n[9] + 4 n[10] + 3 n[11] + 3 n[12] + 3 n[13] + 3 n[14] +
     3 n[15] + 2 n[16] + 2 n[17] + 2 n[18] + 2 n[19] + n[20] + n[21] + n[22] == 0
  && n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 && n[7] ≥ 0 &&
  n[8] ≥ 0 && n[9] ≥ 0 && n[10] ≥ 0 && n[11] ≥ 0 && n[12] ≥ 0 && n[13] ≥ 0 && n[14] ≥ 0 &&
  n[15] ≥ 0 && n[16] ≥ 0 && n[17] ≥ 0 && n[18] ≥ 0 && n[19] ≥ 0 && n[20] ≥ 0 &&
  n[21] ≥ 0 && n[22] ≥ 0 && n[23] ≥ 0 && n[24] ≥ 0 && n[25] ≥ 0, Array[n, 25], Integers]
```

```
{}
```

```
Array[m, 5].Transpose[A]
```

```
{935 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5],
 951 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5],
 967 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5],
 983 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5],
 847 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5],
 863 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5],
 879 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5],
 895 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5],
 911 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5],
 927 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5],
 791 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5],
 807 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5],
 823 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5],
 839 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5],
 855 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5],
 735 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5],
 751 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5],
 767 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5],
 783 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5],
 679 m[1] - 790 m[2] + 232 m[3] - 26 m[4] + m[5],
 695 m[1] - 790 m[2] + 232 m[3] - 26 m[4] + m[5],
 711 m[1] - 790 m[2] + 232 m[3] - 26 m[4] + m[5],
 623 m[1] - 782 m[2] + 232 m[3] - 26 m[4] + m[5],
 639 m[1] - 782 m[2] + 232 m[3] - 26 m[4] + m[5],
 567 m[1] - 774 m[2] + 232 m[3] - 26 m[4] + m[5]}
```

```
Array[m, 5].{39 495, -33 726, 9512, -1066, 41}
```

```
39 495 m[1] - 33 726 m[2] + 9512 m[3] - 1066 m[4] + 41 m[5]
```

```
FindInstance[935 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  951 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  967 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  983 m[1] - 822 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  847 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  863 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  879 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  895 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  911 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  927 m[1] - 814 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  791 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  807 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  823 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  839 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  855 m[1] - 806 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  735 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  751 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  767 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  783 m[1] - 798 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  679 m[1] - 790 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  695 m[1] - 790 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  711 m[1] - 790 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  623 m[1] - 782 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  639 m[1] - 782 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  567 m[1] - 774 m[2] + 232 m[3] - 26 m[4] + m[5] ≥ 0 &&
  39 495 m[1] - 33 726 m[2] + 9512 m[3] - 1066 m[4] + 41 m[5] < 0, Array[m, 5], Integers]
```

```
{{m[1] → 0, m[2] → 3493, m[3] → 0, m[4] → 0, m[5] → 2 871 696}}
```

```
Array[m, 5] /. {m[1] → 0, m[2] → 3493, m[3] → 0, m[4] → 0, m[5] → 2 871 696}
```

```
{0, 3493, 0, 0, 2 871 696}
```

```
GCD[0, 3493, 0, 0, 2 871 696]
```

```
1
```

```
{0, 3493, 0, 0, 2 871 696}.{39 495, -33 726, 9512, -1066, 41}
```

```
-65 382
```

```
{0, 3493, 0, 0, 2 871 696}.
 Transpose[{{935, -822, 232, -26, 1}, {951, -822, 232, -26, 1},
   {967, -822, 232, -26, 1}, {983, -822, 232, -26, 1}, {847, -814, 232, -26, 1},
   {863, -814, 232, -26, 1}, {879, -814, 232, -26, 1}, {895, -814, 232, -26, 1},
   {911, -814, 232, -26, 1}, {927, -814, 232, -26, 1}, {791, -806, 232, -26, 1},
   {807, -806, 232, -26, 1}, {823, -806, 232, -26, 1}, {839, -806, 232, -26, 1},
   {855, -806, 232, -26, 1}, {735, -798, 232, -26, 1}, {751, -798, 232, -26, 1},
   {767, -798, 232, -26, 1}, {783, -798, 232, -26, 1}, {679, -790, 232, -26, 1},
   {695, -790, 232, -26, 1}, {711, -790, 232, -26, 1}, {623, -782, 232, -26, 1},
   {639, -782, 232, -26, 1}, {567, -774, 232, -26, 1}}]
{450, 450, 450, 450, 28 394, 28 394, 28 394, 28 394, 28 394,
 28 394, 56 338, 56 338, 56 338, 56 338, 56 338, 84 282, 84 282,
 84 282, 84 282, 112 226, 112 226, 112 226, 140 170, 140 170, 168 114}
```

```
poly19 = listmod128[[19]]
(-9 + x)^8 (-7 + x)^4 (-5 + x)^2 (5 + x)^25 (52 - 15 x + x^2)
```

```
p19 = poly19 / minipoly[poly19] // Factor
(-9 + x)^7 (-7 + x)^3 (-5 + x) (5 + x)^24
```

```
feasiblesubcharpolylist[(-9 + x)^8 (-7 + x)^4 (-5 + x)^2 (5 + x)^25 (52 - 15 x + x^2)]
{(-9 + x) (-5 + x) (-127 + 87 x - 17 x^2 + x^3), (-9 + x) (-7 + x) (-5 + x) (17 - 10 x + x^2)}
```

```
CoefficientList[
 {(-9 + x) (-5 + x) (-127 + 87 x - 17 x^2 + x^3), (-9 + x) (-7 + x) (-5 + x) (17 - 10 x + x^2)}, x]
{{-5715, 5693, -2110, 370, -31, 1}, {-5355, 5581, -2102, 370, -31, 1}}
```

```
A = {{-5715, 5693, -2110, 370, -31, 1}, {-5355, 5581, -2102, 370, -31, 1}};
```

```
CoefficientList[D[poly19, x] / p19 // Factor, x]
{-233 515, 233 557, -86 558, 15 170, -1271, 41}
```

```
Solve[Array[n, 2].
    {{-5715, 5693, -2110, 370, -31, 1}, {-5355, 5581, -2102, 370, -31, 1}} ==
  {-233 515, 233 557, -86 558, 15 170, -1271, 41}, Array[n, 2]]
{}
```

```
Array[m, 6].Transpose[A]
{-5715 m[1] + 5693 m[2] - 2110 m[3] + 370 m[4] - 31 m[5] + m[6],
 -5355 m[1] + 5581 m[2] - 2102 m[3] + 370 m[4] - 31 m[5] + m[6]}
```

```
Array[m, 6].{-233 515, 233 557, -86 558, 15 170, -1271, 41}
-233 515 m[1] + 233 557 m[2] - 86 558 m[3] + 15 170 m[4] - 1271 m[5] + 41 m[6]
```

```
FindInstance[-5715 m[1] + 5693 m[2] - 2110 m[3] + 370 m[4] - 31 m[5] + m[6] ≥ 0 &&
   -5355 m[1] + 5581 m[2] - 2102 m[3] + 370 m[4] - 31 m[5] + m[6] ≥ 0 &&
   -233 515 m[1] + 233 557 m[2] - 86 558 m[3] + 15 170 m[4] - 1271 m[5] + 41 m[6] < 0,
 Array[m, 6], Integers]
```

```
{{m[1] → 14, m[2] → 1163, m[3] → 15 610, m[4] → 0, m[5] → 0, m[6] → 26 404 920}}
```

```
Array[m, 6] /.
 {m[1] → 14, m[2] → 1163, m[3] → 15 610, m[4] → 0, m[5] → 0, m[6] → 26 404 920}
```

```
{14, 1163, 15 610, 0, 0, 26 404 920}
```

```
GCD[14, 1163, 15 610, 0, 0, 26 404 920]
```

```
1
```

```
{14, 1163, 15 610, 0, 0, 26 404 920}.{-233 515, 233 557, -86 558, 15 170, -1271, 41}
```

```
-211 079
```

```
{14, 1163, 15 610, 0, 0, 26 404 920}.
 Transpose[{{-5715, 5693, -2110, 370, -31, 1}, {-5355, 5581, -2102, 370, -31, 1}}]
```

```
{8769, 8433}
```

```
poly20 = listmod128[[20]]
```

$$(-9+x)^7\,(-7+x)^6\,(5+x)^{25}\left(-232+123\,x-20\,x^2+x^3\right)$$

```
p20 = poly20 / minipoly[poly20] // Factor
```

$$(-9+x)^6\,(-7+x)^5\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-9 + x)^7 (-7 + x)^6 (5 + x)^25 (-232 + 123 x - 20 x^2 + x^3)]
```

$$\Big\{\left(31-12\,x+x^2\right)\left(-169+107\,x-19\,x^2+x^3\right),$$
$$(-7+x)\left(681-648\,x+198\,x^2-24\,x^3+x^4\right),\ (-7+x)\left(41-14\,x+x^2\right)\left(17-10\,x+x^2\right),$$
$$-4847+5233\,x-2034\,x^2+366\,x^3-31\,x^4+x^5,\ (-7+x)\left(23-12\,x+x^2\right)\left(31-12\,x+x^2\right),$$
$$(-9+x)\left(551-522\,x+168\,x^2-22\,x^3+x^4\right),\ (-7+x)^2\left(-87+79\,x-17\,x^2+x^3\right),$$
$$(-7+x)(-5+x)\left(-125+103\,x-19\,x^2+x^3\right),\ (-7+x)\left(641-640\,x+198\,x^2-24\,x^3+x^4\right),$$
$$(-9+x)^2(-5+x)\left(11-8\,x+x^2\right),\ (-9+x)(-7+x)\left(-73+63\,x-15\,x^2+x^3\right),$$
$$(-7+x)^2\left(-79+79\,x-17\,x^2+x^3\right),\ (-7+x)\left(569-632\,x+198\,x^2-24\,x^3+x^4\right),$$
$$(-9+x)(-7+x)(-5+x)\left(13-10\,x+x^2\right),\ (-9+x)(-7+x)\left(-57+63\,x-15\,x^2+x^3\right)\Big\}$$

```
{(31 - 12 x + x^2) (-169 + 107 x - 19 x^2 + x^3), (-7 + x) (681 - 648 x + 198 x^2 - 24 x^3 + x^4),
  (-7 + x) (41 - 14 x + x^2) (17 - 10 x + x^2), -4847 + 5233 x - 2034 x^2 + 366 x^3 - 31 x^4 + x^5,
  (-7 + x) (23 - 12 x + x^2) (31 - 12 x + x^2), (-9 + x) (551 - 522 x + 168 x^2 - 22 x^3 + x^4),
  (-7 + x)^2 (-87 + 79 x - 17 x^2 + x^3), (-7 + x) (-5 + x) (-125 + 103 x - 19 x^2 + x^3),
  (-7 + x) (641 - 640 x + 198 x^2 - 24 x^3 + x^4), (-9 + x)^2 (-5 + x) (11 - 8 x + x^2),
  (-9 + x) (-7 + x) (-73 + 63 x - 15 x^2 + x^3), (-7 + x)^2 (-79 + 79 x - 17 x^2 + x^3),
  (-7 + x) (569 - 632 x + 198 x^2 - 24 x^3 + x^4), (-9 + x) (-7 + x) (-5 + x) (13 - 10 x + x^2),
  (-9 + x) (-7 + x) (-57 + 63 x - 15 x^2 + x^3)} // Length
```

```
15
```

```
CoefficientList[{(31 - 12 x + x^2) (-169 + 107 x - 19 x^2 + x^3),
  (-7 + x) (681 - 648 x + 198 x^2 - 24 x^3 + x^4), (-7 + x) (41 - 14 x + x^2) (17 - 10 x + x^2),
  -4847 + 5233 x - 2034 x^2 + 366 x^3 - 31 x^4 + x^5, (-7 + x) (23 - 12 x + x^2) (31 - 12 x + x^2),
  (-9 + x) (551 - 522 x + 168 x^2 - 22 x^3 + x^4), (-7 + x)^2 (-87 + 79 x - 17 x^2 + x^3),
  (-7 + x) (-5 + x) (-125 + 103 x - 19 x^2 + x^3), (-7 + x) (641 - 640 x + 198 x^2 - 24 x^3 + x^4),
  (-9 + x)^2 (-5 + x) (11 - 8 x + x^2), (-9 + x) (-7 + x) (-73 + 63 x - 15 x^2 + x^3),
  (-7 + x)^2 (-79 + 79 x - 17 x^2 + x^3), (-7 + x) (569 - 632 x + 198 x^2 - 24 x^3 + x^4),
  (-9 + x) (-7 + x) (-5 + x) (13 - 10 x + x^2), (-9 + x) (-7 + x) (-57 + 63 x - 15 x^2 + x^3)}, x]
```

```
{{-5239, 5345, -2042, 366, -31, 1},
 {-4767, 5217, -2034, 366, -31, 1}, {-4879, 5233, -2034, 366, -31, 1},
 {-4847, 5233, -2034, 366, -31, 1}, {-4991, 5249, -2034, 366, -31, 1},
 {-4959, 5249, -2034, 366, -31, 1}, {-4263, 5089, -2026, 366, -31, 1},
 {-4375, 5105, -2026, 366, -31, 1}, {-4487, 5121, -2026, 366, -31, 1},
 {-4455, 5121, -2026, 366, -31, 1}, {-4599, 5137, -2026, 366, -31, 1},
 {-3871, 4977, -2018, 366, -31, 1}, {-3983, 4993, -2018, 366, -31, 1},
 {-4095, 5009, -2018, 366, -31, 1}, {-3591, 4881, -2010, 366, -31, 1}}
```

```
A = {{-5239, 5345, -2042, 366, -31, 1},
    {-4767, 5217, -2034, 366, -31, 1}, {-4879, 5233, -2034, 366, -31, 1},
    {-4847, 5233, -2034, 366, -31, 1}, {-4991, 5249, -2034, 366, -31, 1},
    {-4959, 5249, -2034, 366, -31, 1}, {-4263, 5089, -2026, 366, -31, 1},
    {-4375, 5105, -2026, 366, -31, 1}, {-4487, 5121, -2026, 366, -31, 1},
    {-4455, 5121, -2026, 366, -31, 1}, {-4599, 5137, -2026, 366, -31, 1},
    {-3871, 4977, -2018, 366, -31, 1}, {-3983, 4993, -2018, 366, -31, 1},
    {-4095, 5009, -2018, 366, -31, 1}, {-3591, 4881, -2010, 366, -31, 1}};
```

```
CoefficientList[D[poly20, x] / p20 // Factor, x]
```

```
{-207 175, 217 305, -83 618, 15 006, -1271, 41}
```

```
Solve[Array[n, 15].{{-5239, 5345, -2042, 366, -31, 1},
    {-4767, 5217, -2034, 366, -31, 1}, {-4879, 5233, -2034, 366, -31, 1},
    {-4847, 5233, -2034, 366, -31, 1}, {-4991, 5249, -2034, 366, -31, 1},
    {-4959, 5249, -2034, 366, -31, 1}, {-4263, 5089, -2026, 366, -31, 1},
    {-4375, 5105, -2026, 366, -31, 1}, {-4487, 5121, -2026, 366, -31, 1},
    {-4455, 5121, -2026, 366, -31, 1}, {-4599, 5137, -2026, 366, -31, 1},
    {-3871, 4977, -2018, 366, -31, 1}, {-3983, 4993, -2018, 366, -31, 1},
    {-4095, 5009, -2018, 366, -31, 1}, {-3591, 4881, -2010, 366, -31, 1}} ==
  {-207175, 217305, -83618, 15006, -1271, 41}, Array[n, 15]]
```

Solve::svars : Equations may not give solutions for all "solve" variables. ≫

```
{{n[10] → 36 - n[1] - n[4] - n[6],
  n[13] → 98 - 2 n[1] - 3 n[2] - 2 n[3] - n[4] - n[5] - 3 n[7] - 2 n[8] - n[9] - 2 n[12],
  n[14] → -19 - n[3] - 2 n[5] - n[6] + n[7] - n[9] - 2 n[11] + n[12],
  n[15] → -74 + 2 n[1] + 2 n[2] + 2 n[3] + n[4] + 2 n[5] + n[6] + n[7] + n[8] + n[9] + n[11]}}
```

```
FindInstance[-n[10] + 36 - n[1] - n[4] - n[6] == 0 &&
  -n[13] + 98 - 2 n[1] - 3 n[2] - 2 n[3] - n[4] - n[5] - 3 n[7] - 2 n[8] - n[9] - 2 n[12] == 0 &&
  -n[14] - 19 - n[3] - 2 n[5] - n[6] + n[7] - n[9] - 2 n[11] + n[12] == 0 &&
  -n[15] - 74 + 2 n[1] + 2 n[2] + 2 n[3] + n[4] + 2 n[5] + n[6] + n[7] + n[8] + n[9] + n[11] ==
   0 && n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0 && n[6] ≥ 0 &&
  n[7] ≥ 0 && n[8] ≥ 0 && n[9] ≥ 0 && n[10] ≥ 0 && n[11] ≥ 0 && n[12] ≥ 0 &&
  n[13] ≥ 0 && n[14] ≥ 0 && n[15] ≥ 0, Array[n, 15], Integers]
```

```
{}
```

```
Array[m, 6].Transpose[A]
```

```
{-5239 m[1] + 5345 m[2] - 2042 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4767 m[1] + 5217 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4879 m[1] + 5233 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4847 m[1] + 5233 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4991 m[1] + 5249 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4959 m[1] + 5249 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4263 m[1] + 5089 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4375 m[1] + 5105 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4487 m[1] + 5121 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4455 m[1] + 5121 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4599 m[1] + 5137 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6],
 -3871 m[1] + 4977 m[2] - 2018 m[3] + 366 m[4] - 31 m[5] + m[6],
 -3983 m[1] + 4993 m[2] - 2018 m[3] + 366 m[4] - 31 m[5] + m[6],
 -4095 m[1] + 5009 m[2] - 2018 m[3] + 366 m[4] - 31 m[5] + m[6],
 -3591 m[1] + 4881 m[2] - 2010 m[3] + 366 m[4] - 31 m[5] + m[6]}
```

```
Array[m, 6].{-207175, 217305, -83618, 15006, -1271, 41}
```

```
-207175 m[1] + 217305 m[2] - 83618 m[3] + 15006 m[4] - 1271 m[5] + 41 m[6]
```

```
FindInstance[-5239 m[1] + 5345 m[2] - 2042 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4767 m[1] + 5217 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4879 m[1] + 5233 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4847 m[1] + 5233 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4991 m[1] + 5249 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4959 m[1] + 5249 m[2] - 2034 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4263 m[1] + 5089 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4375 m[1] + 5105 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4487 m[1] + 5121 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4455 m[1] + 5121 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4599 m[1] + 5137 m[2] - 2026 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -3871 m[1] + 4977 m[2] - 2018 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -3983 m[1] + 4993 m[2] - 2018 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -4095 m[1] + 5009 m[2] - 2018 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -3591 m[1] + 4881 m[2] - 2010 m[3] + 366 m[4] - 31 m[5] + m[6] ≥ 0 &&
  -207 175 m[1] + 217 305 m[2] - 83 618 m[3] + 15 006 m[4] - 1271 m[5] + 41 m[6] < 0,
 Array[m, 6], Integers]
```

```
{{m[1] → -1026, m[2] → -4476, m[3] → -9088, m[4] → 0, m[5] → 0, m[6] → 0}}
```

```
Array[m, 6] /.
 {m[1] → -1026, m[2] → -4476, m[3] → -9088, m[4] → 0, m[5] → 0, m[6] → 0}
```

```
{-1026, -4476, -9088, 0, 0, 0}
```

```
GCD[-1026, -4476, -9088, 0, 0, 0]
```

```
2
```

```
{-1026, -4476, -9088, 0, 0, 0} / 2
```

```
{-513, -2238, -4544, 0, 0, 0}
```

```
Reverse[{-513, -2238, -4544, 0, 0, 0}]
```

```
{0, 0, 0, -4544, -2238, -513}
```

```
{-513, -2238, -4544, 0, 0, 0}.{-207 175, 217 305, -83 618, 15 006, -1271, 41}
```

```
-87 623
```

```
{-513, -2238, -4544, 0, 0, 0}.
 Transpose[{{-5239, 5345, -2042, 366, -31, 1}, {-4767, 5217, -2034, 366, -31, 1},
   {-4879, 5233, -2034, 366, -31, 1}, {-4847, 5233, -2034, 366, -31, 1},
   {-4991, 5249, -2034, 366, -31, 1}, {-4959, 5249, -2034, 366, -31, 1},
   {-4263, 5089, -2026, 366, -31, 1}, {-4375, 5105, -2026, 366, -31, 1},
   {-4487, 5121, -2026, 366, -31, 1}, {-4455, 5121, -2026, 366, -31, 1},
   {-4599, 5137, -2026, 366, -31, 1}, {-3871, 4977, -2018, 366, -31, 1},
   {-3983, 4993, -2018, 366, -31, 1}, {-4095, 5009, -2018, 366, -31, 1},
   {-3591, 4881, -2010, 366, -31, 1}}]
```

```
{4345, 12 321, 33 969, 17 553, 55 617, 39 201, 3881,
 25 529, 47 177, 30 761, 68 825, 17 089, 38 737, 60 385, 51 945}
```

```
Length[{4345, 12 321, 33 969, 17 553, 55 617, 39 201,
  3881, 25 529, 47 177, 30 761, 68 825, 17 089, 38 737, 60 385, 51 945}]
```

15

```
{-1026, -4476, -9088, 0, 0, 0}.{-207 175, 217 305, -83 618, 15 006, -1271, 41}
```

-175 246

```
{-1026, -4476, -9088, 0, 0, 0}.
 Transpose[{{-5239, 5345, -2042, 366, -31, 1}, {-4767, 5217, -2034, 366, -31, 1},
   {-4879, 5233, -2034, 366, -31, 1}, {-4847, 5233, -2034, 366, -31, 1},
   {-4991, 5249, -2034, 366, -31, 1}, {-4959, 5249, -2034, 366, -31, 1},
   {-4263, 5089, -2026, 366, -31, 1}, {-4375, 5105, -2026, 366, -31, 1},
   {-4487, 5121, -2026, 366, -31, 1}, {-4455, 5121, -2026, 366, -31, 1},
   {-4599, 5137, -2026, 366, -31, 1}, {-3871, 4977, -2018, 366, -31, 1},
   {-3983, 4993, -2018, 366, -31, 1}, {-4095, 5009, -2018, 366, -31, 1},
   {-3591, 4881, -2010, 366, -31, 1}}]
```

{8690, 24 642, 67 938, 35 106, 111 234, 78 402, 7762,
 51 058, 94 354, 61 522, 137 650, 34 178, 77 474, 120 770, 103 890}

```
poly21 = listmod128[[21]]
```

$(-9+x)^6\ (-7+x)^7\ (5+x)^{25}\ \left(-292+149\,x-22\,x^2+x^3\right)$

```
p21 = poly21 / minipoly[poly21] // Factor
```

$(-9+x)^5\ (-7+x)^6\ (5+x)^{24}$

```
feasiblesubcharpolylist[(-9 + x)^6 (-7 + x)^7 (5 + x)^25 (-292 + 149 x - 22 x^2 + x^3)]
```

$\left\{(-9+x)\ (-7+x)\ (-5+x)\ \left(19-12\,x+x^2\right),\ (-9+x)\ \left(681-648\,x+198\,x^2-24\,x^3+x^4\right),\right.$
$(-9+x)\ \left(41-14\,x+x^2\right)\ \left(17-10\,x+x^2\right),\ (-9+x)\ \left(23-12\,x+x^2\right)\ \left(31-12\,x+x^2\right),$
$(-9+x)\ (-7+x)\ \left(-87+79\,x-17\,x^2+x^3\right),\ (-9+x)\ (-5+x)\ \left(-125+103\,x-19\,x^2+x^3\right),$
$(-9+x)\ \left(641-640\,x+198\,x^2-24\,x^3+x^4\right),\ (-9+x)\ (-7+x)\ \left(-79+79\,x-17\,x^2+x^3\right),$
$(-9+x)\ \left(569-632\,x+198\,x^2-24\,x^3+x^4\right),\ (-9+x)\ (-7+x)\ \left(-71+79\,x-17\,x^2+x^3\right),$
$\left.(-9+x)^2\ \left(-57+63\,x-15\,x^2+x^3\right),\ (-9+x)^2\ (-7+x)^2\ (-1+x)\right\}$

```
{(-9 + x) (-7 + x) (-5 + x) (19 - 12 x + x^2), (-9 + x) (681 - 648 x + 198 x^2 - 24 x^3 + x^4),
  (-9 + x) (41 - 14 x + x^2) (17 - 10 x + x^2), (-9 + x) (23 - 12 x + x^2) (31 - 12 x + x^2),
  (-9 + x) (-7 + x) (-87 + 79 x - 17 x^2 + x^3), (-9 + x) (-5 + x) (-125 + 103 x - 19 x^2 + x^3),
  (-9 + x) (641 - 640 x + 198 x^2 - 24 x^3 + x^4), (-9 + x) (-7 + x) (-79 + 79 x - 17 x^2 + x^3),
  (-9 + x) (569 - 632 x + 198 x^2 - 24 x^3 + x^4), (-9 + x) (-7 + x) (-71 + 79 x - 17 x^2 + x^3),
  (-9 + x)^2 (-57 + 63 x - 15 x^2 + x^3), (-9 + x)^2 (-7 + x)^2 (-1 + x)} // Length
```

12

```
CoefficientList[
 {(-9 + x) (-7 + x) (-5 + x) (19 - 12 x + x^2), (-9 + x) (681 - 648 x + 198 x^2 - 24 x^3 + x^4),
  (-9 + x) (41 - 14 x + x^2) (17 - 10 x + x^2), (-9 + x) (23 - 12 x + x^2) (31 - 12 x + x^2),
  (-9 + x) (-7 + x) (-87 + 79 x - 17 x^2 + x^3), (-9 + x) (-5 + x) (-125 + 103 x - 19 x^2 + x^3),
  (-9 + x) (641 - 640 x + 198 x^2 - 24 x^3 + x^4), (-9 + x) (-7 + x) (-79 + 79 x - 17 x^2 + x^3),
  (-9 + x) (569 - 632 x + 198 x^2 - 24 x^3 + x^4), (-9 + x) (-7 + x) (-71 + 79 x - 17 x^2 + x^3),
  (-9 + x)^2 (-57 + 63 x - 15 x^2 + x^3), (-9 + x)^2 (-7 + x)^2 (-1 + x)}, x]
```

```
{{-5985, 6497, -2430, 414, -33, 1}, {-6129, 6513, -2430, 414, -33, 1},
 {-6273, 6529, -2430, 414, -33, 1}, {-6417, 6545, -2430, 414, -33, 1},
 {-5481, 6369, -2422, 414, -33, 1}, {-5625, 6385, -2422, 414, -33, 1},
 {-5769, 6401, -2422, 414, -33, 1}, {-4977, 6241, -2414, 414, -33, 1},
 {-5121, 6257, -2414, 414, -33, 1}, {-4473, 6113, -2406, 414, -33, 1},
 {-4617, 6129, -2406, 414, -33, 1}, {-3969, 5985, -2398, 414, -33, 1}}
```

```
A = {{-5985, 6497, -2430, 414, -33, 1}, {-6129, 6513, -2430, 414, -33, 1},
    {-6273, 6529, -2430, 414, -33, 1}, {-6417, 6545, -2430, 414, -33, 1},
    {-5481, 6369, -2422, 414, -33, 1}, {-5625, 6385, -2422, 414, -33, 1},
    {-5769, 6401, -2422, 414, -33, 1}, {-4977, 6241, -2414, 414, -33, 1},
    {-5121, 6257, -2414, 414, -33, 1}, {-4473, 6113, -2406, 414, -33, 1},
    {-4617, 6129, -2406, 414, -33, 1}, {-3969, 5985, -2398, 414, -33, 1}};
```

```
MatrixRank[A]
```

```
3
```

```
CoefficientList[D[poly21, x] / p21 // Factor, x]
```

```
{-259 665, 268 537, -99 702, 16 974, -1353, 41}
```

```
Solve[Array[n, 12].
    {{-5985, 6497, -2430, 414, -33, 1}, {-6129, 6513, -2430, 414, -33, 1},
     {-6273, 6529, -2430, 414, -33, 1}, {-6417, 6545, -2430, 414, -33, 1},
     {-5481, 6369, -2422, 414, -33, 1}, {-5625, 6385, -2422, 414, -33, 1},
     {-5769, 6401, -2422, 414, -33, 1}, {-4977, 6241, -2414, 414, -33, 1},
     {-5121, 6257, -2414, 414, -33, 1}, {-4473, 6113, -2406, 414, -33, 1},
     {-4617, 6129, -2406, 414, -33, 1}, {-3969, 5985, -2398, 414, -33, 1}} ==
   {-259 665, 268 537, -99 702, 16 974, -1353, 41}, Array[n, 12]]
```

```
{}
```

```
Array[m, 6].Transpose[A]
```

```
{-5985 m[1] + 6497 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6],
 -6129 m[1] + 6513 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6],
 -6273 m[1] + 6529 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6],
 -6417 m[1] + 6545 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6],
 -5481 m[1] + 6369 m[2] - 2422 m[3] + 414 m[4] - 33 m[5] + m[6],
 -5625 m[1] + 6385 m[2] - 2422 m[3] + 414 m[4] - 33 m[5] + m[6],
 -5769 m[1] + 6401 m[2] - 2422 m[3] + 414 m[4] - 33 m[5] + m[6],
 -4977 m[1] + 6241 m[2] - 2414 m[3] + 414 m[4] - 33 m[5] + m[6],
 -5121 m[1] + 6257 m[2] - 2414 m[3] + 414 m[4] - 33 m[5] + m[6],
 -4473 m[1] + 6113 m[2] - 2406 m[3] + 414 m[4] - 33 m[5] + m[6],
 -4617 m[1] + 6129 m[2] - 2406 m[3] + 414 m[4] - 33 m[5] + m[6],
 -3969 m[1] + 5985 m[2] - 2398 m[3] + 414 m[4] - 33 m[5] + m[6]}
```

```
Array[m, 6].{-259 665, 268 537, -99 702, 16 974, -1353, 41}
```

```
-259 665 m[1] + 268 537 m[2] - 99 702 m[3] + 16 974 m[4] - 1353 m[5] + 41 m[6]
```

```
FindInstance[-5985 m[1] + 6497 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -6129 m[1] + 6513 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -6273 m[1] + 6529 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -6417 m[1] + 6545 m[2] - 2430 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -5481 m[1] + 6369 m[2] - 2422 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -5625 m[1] + 6385 m[2] - 2422 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -5769 m[1] + 6401 m[2] - 2422 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -4977 m[1] + 6241 m[2] - 2414 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -5121 m[1] + 6257 m[2] - 2414 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -4473 m[1] + 6113 m[2] - 2406 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -4617 m[1] + 6129 m[2] - 2406 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -3969 m[1] + 5985 m[2] - 2398 m[3] + 414 m[4] - 33 m[5] + m[6] ≥ 0 &&
   -259 665 m[1] + 268 537 m[2] - 99 702 m[3] + 16 974 m[4] - 1353 m[5] + 41 m[6] < 0,
 Array[m, 6], Integers]
```

```
{{m[1] → -180, m[2] → -1613, m[3] → -3873, m[4] → 0, m[5] → 0, m[6] → 0}}
```

```
Array[m, 6] /. {m[1] → -180, m[2] → -1613, m[3] → -3873, m[4] → 0, m[5] → 0, m[6] → 0}
```

```
{-180, -1613, -3873, 0, 0, 0}
```

```
GCD[-180, -1613, -3873, 0, 0, 0]
```

```
1
```

```
{-180, -1613, -3873, 0, 0, 0}.{-259 665, 268 537, -99 702, 16 974, -1353, 41}
```

```
-264 635
```

```
{-180, -1613, -3873, 0, 0, 0}.
 Transpose[{{-5985, 6497, -2430, 414, -33, 1}, {-6129, 6513, -2430, 414, -33, 1},
   {-6273, 6529, -2430, 414, -33, 1}, {-6417, 6545, -2430, 414, -33, 1},
   {-5481, 6369, -2422, 414, -33, 1}, {-5625, 6385, -2422, 414, -33, 1},
   {-5769, 6401, -2422, 414, -33, 1}, {-4977, 6241, -2414, 414, -33, 1},
   {-5121, 6257, -2414, 414, -33, 1}, {-4473, 6113, -2406, 414, -33, 1},
   {-4617, 6129, -2406, 414, -33, 1}, {-3969, 5985, -2398, 414, -33, 1}}]
```

$$\{9029, 9141, 9253, 9365, 93\,789, 93\,901, 94\,013, 178\,549, 178\,661, 263\,309, 263\,421, 348\,069\}$$

```
poly22 = listmod128[[22]]
```

$$(-9+x)^8\,(-8+x)\,(-7+x)^6\,(-3+x)\,(5+x)^{25}$$

```
p22 = poly22 / minipoly[poly22] // Factor
```

$$(-9+x)^7\,(-7+x)^5\,(5+x)^{24}$$

```
feasiblesubcharpolylist[(-9 + x)^8 (-8 + x) (-7 + x)^6 (-3 + x) (5 + x)^25]
```

$$\{(-9+x)\,(-7+x)\,(-3+x)^2,\ (-7+x)\left(-73+63x-15x^2+x^3\right),\ \left(31-12x+x^2\right)\left(17-10x+x^2\right),\ (-7+x)\,(-5+x)\left(13-10x+x^2\right),\ (-7+x)\left(-57+63x-15x^2+x^3\right)\}$$

```
{(-9 + x) (-7 + x) (-3 + x)^2, (-7 + x) (-73 + 63 x - 15 x^2 + x^3),
  (31 - 12 x + x^2) (17 - 10 x + x^2), (-7 + x) (-5 + x) (13 - 10 x + x^2),
  (-7 + x) (-57 + 63 x - 15 x^2 + x^3)} // Length
```

5

```
CoefficientList[{(-9 + x) (-7 + x) (-3 + x)^2,
  (-7 + x) (-73 + 63 x - 15 x^2 + x^3), (31 - 12 x + x^2) (17 - 10 x + x^2),
  (-7 + x) (-5 + x) (13 - 10 x + x^2), (-7 + x) (-57 + 63 x - 15 x^2 + x^3)}, x]
```

$$\{\{567, -522, 168, -22, 1\}, \{511, -514, 168, -22, 1\}, \{527, -514, 168, -22, 1\}, \{455, -506, 168, -22, 1\}, \{399, -498, 168, -22, 1\}\}$$

```
CoefficientList[D[poly22, x] / p22 // Factor, x]
```

$$\{21\,135, -21\,018, 6888, -902, 41\}$$

```
Solve[Array[n, 5].{{567, -522, 168, -22, 1}, {511, -514, 168, -22, 1},
    {527, -514, 168, -22, 1}, {455, -506, 168, -22, 1}, {399, -498, 168, -22, 1}} ==
  {21 135, -21 018, 6888, -902, 41}, Array[n, 5]]
```

Solve::svars : Equations may not give solutions for all "solve" variables. ≫

$$\{\{n[3] \to 36,\ n[4] \to 3 - 3\,n[1] - 2\,n[2],\ n[5] \to 2 + 2\,n[1] + n[2]\}\}$$

```
Array[n, 5] /.
 Solve[-n[3] + 36 == 0 && -n[4] + 3 - 3 n[1] - 2 n[2] == 0 && -n[5] + 2 + 2 n[1] + n[2] == 0 &&
   n[1] ≥ 0 && n[2] ≥ 0 && n[3] ≥ 0 && n[4] ≥ 0 && n[5] ≥ 0, Array[n, 5], Integers]
```

```
{{0, 0, 36, 3, 2}, {0, 1, 36, 1, 3}, {1, 0, 36, 0, 4}}
```