

$$\begin{aligned}
 x^6 &= 192m^5 - 240m^4 - 80am^3 + 160m^2 + 80am^2 + 32bm^2 - 60m - 40am - 24bm - 12cm + 12m^0 + 10am^0 + 8bm^0 + 6cm^0 + 4d^0 \\
 x^5 &= 80m^4 - 80m^3 - 32am^2 + 40m^2 + 24am^2 + 12bm^2 - 10m - 8am - 6bm - 4cm + m^0 + am^0 + bm^0 + cm^0 + dm^0 \\
 x^4 &= 32m^3 - 24m^2 - 12am^2 + 8m + 6am + 4bm - m^0 - am^0 - bm^0 - cm^0 \\
 x^3 &= 12m^2 - 6m - 4am + m^0 + am^0 + bm^0 \\
 x^2 &= 4m - m^0 - am^0
 \end{aligned}$$

$$\begin{aligned}
 &\frac{n}{1}(2m)^{n-1} - \frac{n(n-1)}{1 \cdot 2}(2m)^{n-2} + \frac{n(n-1)(n-2)}{1 \cdot 2 \cdot 3}(2m)^{n-3} - \frac{n(n-1)(n-2)(n-3)}{1 \cdot 2 \cdot 3 \cdot 4}(2m)^{n-4} \\
 &- \frac{a(n-1)}{1}(2m)^{n-2} + \frac{a(n-1)(n-2)}{1 \cdot 2}(2m)^{n-3} - \frac{a(n-1)(n-2)(n-3)}{1 \cdot 2 \cdot 3}(2m)^{n-4} \\
 &+ \frac{b(n-2)}{1}(2m)^{n-3} - \frac{b(n-2)(n-3)}{1 \cdot 2}(2m)^{n-4}
 \end{aligned}$$

$$\begin{aligned}
 &\frac{4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 2} \\
 &\frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 2} \\
 &\frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 2} \\
 &\frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 2}
 \end{aligned}$$

$$\frac{a(n-1)(n-2)2m^{n-5}}{2}$$

$$\frac{(n-1)(2m)^{n-2}}{a \cdot 3}$$

$$\frac{3 \cdot 2 \cdot 1}{1 \cdot 2 \cdot 3}$$

$$\frac{4 \cdot 3 \cdot 2}{a}$$

$$\frac{4 \cdot 3 \cdot 2}{1 \cdot 2 \cdot 3} 2m^1$$

$$\frac{5 \cdot 4 \cdot 3}{2}$$

$$\frac{b(n-2)(2m)^{n-3}}{1}$$

$$\frac{1 \cdot 2 \cdot 3}{2 \cdot 2}$$

$$3 \cdot 1 \cdot 4 \cdot 6 \cdot 5 \cdot 24 \cdot 6 \cdot 80$$

$$3 \cdot 24 \cdot 120 \cdot \frac{360}{440}$$

$$\frac{a(n-1)(n-2)(n-3)2m^{n-4}}{1 \cdot 2 \cdot 3}$$

$$\frac{1 \cdot 2 \cdot 3}{2 \cdot 2}$$

$$9 \cdot 8 \cdot 5 \cdot 2 \cdot 4 \cdot 2$$

$$\frac{1 \cdot 10 \cdot 60}{2 \cdot (n-4) \cdot (n-2) \cdot (n-1) \cdot 2}$$

$$\frac{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8 \cdot 9 \cdot 10 \cdot 11 \cdot 12 \cdot 13 \cdot 14 \cdot 15 \cdot 16 \cdot 17 \cdot 18 \cdot 19 \cdot 20}{2 \cdot 2}$$

$$\begin{aligned}
 &63 \\
 &88 \\
 &25 \\
 &1 \cdot 32 \cdot 120 \\
 &1 \cdot 8 \cdot 40 \cdot 160 \\
 &ARC 40267 / A5.15
 \end{aligned}$$

63. 3167. 28031. 144495. 468559. 1214423. 2702727. 5386591. 9874655
 3104. 24864. 116464. 324064. 745864. 1488304. 2683864. 4488064
 21760. 91600. 207600. 421800. 742440. 1195560. 1804200
 59840. 116000. 214200. 320640. 453120. 608640. $2n(n-1)$
 46160. 98200. 106440. 132480. 155520. $n(n-1)$
 32040. 18240. 26040. 22940. $\frac{12}{4}$
 $\frac{A_n}{2(n-1)}$ $n(n-1)$

~~63. 3167. 28031. 144495~~

63. 3367. 31031. 144495. 468559. 1214423. 2702727. 5386591. 9874655
 3304. 27664. 113464. 324064. 745864. 1488304. 2683864. 4488064
 24360. 85800. 210600. 421800. 742440. 1195560. 1804200
 61440. 124800. 211200. 320640. 453120. 608640
 3360. 86400. 109440. 132480. 155520
 23040. 23040. 23040. 23040

$x^6 = -320m^6 + 480m^5 - 320m^4 + 120m^3 - 24m^2 + 2m$
 $x^5 = -128m^5 + 160m^4 - 80m^3 + 20m^2 - 2m$
 $x^4 = -48m^4 + 48m^3 - 16m^2 + 2m$
 $x^3 = -16m^3 + 12m^2 - 2m$
 $x^2 = -4m^2 + 2m$

$\pm 2m$

$n^2 \cdot 4$

A

$\frac{4n(n-1)}{2}$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$x^6 = 192m^5 - 240m^4 + 160m^3 - 60m^2 + 12m - 1$
 $x^5 = 80m^4 - 80m^3 + 40m^2 - 10m + 1$
 $x^4 = 32m^3 - 24m^2 + 8m - 1$
 $x^3 = 12m^2 - 6m + 1$
 $x^2 = 4m - 1$

$$\frac{1}{1} \pm \frac{2n(n-1)}{2} \pm \frac{2n(n-1)(n-2)}{2} \pm \frac{2n(n-1)(n-2)(n-3)}{3} \pm \frac{2n(n-1)(n-2)(n-3)(n-4)}{4} \pm \frac{2n(n-1)(n-2)(n-3)(n-4)(n-5)}{5} \pm \frac{2n(n-1)(n-2)(n-3)(n-4)(n-5)(n-6)}{6}$$

2

$\frac{2n(n-1)}{3}$

$\frac{2n}{6} \cdot \frac{3}{2}$

$n \cdot 4 \cdot 5$

Q2. 9372: 179530. 893816. 368559a. 11587092. 30308642. 694108240. 143731566.
 9310. 130158. 754286. 2791774. 7901502. 18721550. 39099598. 74323326
 120848. 624128. 2037488. 5109728. 10870048. 20378048. 35223728
 503280. 1413360. 3072240. 5719320. 9558000. 14845680
 910080. 1658880. ~~2698800~~³⁴¹⁸⁰. 3847680. 5287680

748800 1999200 1289600 1440000

$$\begin{array}{r} 960 \\ 192 \\ \hline 20160 \\ 3200 \\ 1600 \\ 72 \end{array}$$

$$\begin{array}{r} 14400 \\ 480 \\ 840 \\ 9310 \end{array}$$

$$230400$$

$$230400$$

$$230400$$

$$\begin{array}{r} 320 \\ 320 \\ 24 \\ \hline 664 \end{array}$$

$$\begin{array}{r} 480 \\ 120 \\ 64 \\ \hline 664 \end{array}$$

$$\begin{array}{r} 25032 \\ 25030 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 690480 \\ \hline 720 \end{array}$$

$$\begin{array}{r} 2400a = 672000 \\ 690480 \\ \hline 144000 \end{array}$$

$$\begin{array}{r} 24c \\ 7680 \\ \hline 320 \end{array}$$

$$\begin{array}{r} 3360a = 1075200 \\ 1062880 \\ \hline 122320 \end{array}$$

$$\begin{array}{r} 2520a = 806400 \\ -120b = 57600 \\ \hline -b = 480 \end{array}$$

$$\begin{array}{r} 720a = 230400 \\ 6a = 1920 \\ a = 320 \\ \hline 2520 \end{array}$$

$$\begin{array}{r} 480 \\ 320 \\ 564000 \\ 1208400 \end{array}$$

$$\begin{array}{r} 18064 \\ 19260 \\ 18600 \\ \hline 208680 \\ 48 \end{array}$$

$$\begin{array}{r} 25200 \\ 806400 \\ 748800 \\ \hline 120b = 57600 \\ 480 \end{array}$$

$$\begin{array}{r} 3360 \\ 320 \\ \hline 672 \\ 1008 \end{array}$$

$$3360a = \begin{array}{r} 1075200 \\ 1082880 \end{array}$$

$$24c =$$

$$\begin{array}{r} 21000 \\ 600 \\ \hline 691200 \\ 690480 \\ \hline 720 \end{array}$$

$$\begin{array}{r} 480 \\ 300 \\ 144 \\ \hline 924 \end{array}$$

$$\begin{array}{r} 172800 \\ 910080 \end{array}$$

$$\begin{array}{r} 480 \\ 390 \\ 432 \\ 144 \\ \hline 187200 \\ 503280 \\ \hline 690480 \end{array}$$

$$\begin{aligned}
 x^6 &= \dots - 320m^6 + 480m^5 - 420m^4 + 120m^3 - 24m^2 + 2m \\
 x^5 &= \dots - 128m^5 + 160m^4 - 80m^3 + 20m^2 - 2m \\
 x^4 &= \dots - 48m^4 + 48m^3 - 16m^2 + 2m \\
 x^3 &= \dots - 16m^3 + 12m^2 - 2m \\
 x^2 &= \dots - 4m^2 + 2m
 \end{aligned}$$

$$\begin{aligned}
 &1 \cdot 4, 2 \cdot 8, 3 \cdot 16, 4 \cdot 32, 5 \cdot 64 \\
 &(n-1)2^n
 \end{aligned}$$

$$\begin{aligned}
 &1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 32 \cdot 6 \cdot 80 \\
 &1 \cdot 2 \cdot 3 \cdot 2 \cdot 2 \cdot 4 \cdot 3 \cdot 4 \cdot 5 \cdot 4 \cdot 8 \cdot 6 \cdot 5 \cdot 16
 \end{aligned}$$

$$\frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{1 \cdot 2 \cdot 3} (n-1)(n-2) 2^{n-1}$$

$$\begin{aligned}
 &1 \cdot 2 \cdot 2 \cdot 1 \cdot 2 \cdot 1 \cdot 3 \cdot 4 \cdot 2 \cdot 1 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 2 \\
 &2 \cdot 1 \cdot 2 \cdot 1 \cdot 1 \cdot 3 \cdot 2 \cdot 2
 \end{aligned}$$

$$\frac{n}{n^2}$$

$$2 \cdot 1$$

$$\frac{(n)(n-1)(n-2)2^{n-2}}{1 \cdot 2 \cdot 3}$$

$$\frac{n(n-1)(n-2)(n-3)(n-4)(2m)^{n-4}}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5}$$

$$\frac{n(n-1)(n-2)(n-3)2^{n-3}}{1 \cdot 2 \cdot 3 \cdot 4}$$

$$\begin{aligned}
 &6 \cdot 4 \cdot 3 \cdot 2^3 \\
 &1 \cdot 2 \cdot 3 \cdot 4 \cdot 2 \cdot 1, 3 \cdot 2, 4 \cdot 4, 5 \cdot 8, 6 \cdot 16
 \end{aligned}$$

$$\frac{n(n-1)2^{n-1}}{2}$$

$$2 \cdot 1 \cdot 3 \cdot 2 \cdot 4$$

$$2 \cdot 3 \cdot 8$$

$$5 \cdot 2 \cdot 16$$

$$\frac{3 \cdot 5 \cdot 320}{100} = 480$$

$$\frac{2 \cdot 16 \cdot 80}{320}$$

$$\begin{aligned}
 &2 \cdot 1 \cdot 8 \cdot 2 \cdot 12 \cdot 96 \cdot 480 \cdot 1620 \\
 &3 \cdot 4 \cdot 2 \cdot 4 \cdot 5 \cdot 96 \cdot 6 \cdot 270
 \end{aligned}$$

$$\frac{(n+1)n(n-1)2^{n-2}}{1 \cdot 2 \cdot 3}$$

$$\frac{30}{16}$$

$$\frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 2^2}{1 \cdot 2 \cdot 3 \cdot 4}$$

$$\frac{6 \cdot 5 \cdot 4 \cdot 2^4}{1 \cdot 2 \cdot 3}$$

$$\frac{3 \cdot 2 \cdot 1 \cdot 2^1}{1 \cdot 2 \cdot 3}$$

$$\frac{4 \cdot 3 \cdot 2 \cdot 2^2}{1 \cdot 2 \cdot 3} = 16$$

$$\frac{5 \cdot 4 \cdot 3 \cdot 2^3}{1 \cdot 2 \cdot 3}$$

Handwritten scribbles and marks at the bottom right of the page.

$$n2^{n-1}m^{n-1} - n(n-1)2^{n-2}m^{n-2} + \frac{n(n-1)(n-2)}{2}2^{n-3}m^{n-3}$$

$$x^6 \dots 192m^5 - 240m^4 + 160m^3 - 60m^2 + 12m - 1$$

$$x^5 \dots 80m^4 - 80m^3 + 40m^2 - 10m + 1$$

$$x^4 \dots 32m^3 - 24m^2 + 8m - 1$$

$$x^3 \dots 12m^2 - 6m + 1$$

$$x^2 \dots 4m - 1$$

$$\frac{3 \cdot 4}{2} \cdot \frac{4 \cdot 6}{2} \cdot \frac{5 \cdot 32}{2} \cdot \frac{6 \cdot 40}{2} \cdot \frac{7 \cdot 192}{2}$$

$$2 \cdot 2 \cdot 4 \cdot 3 \cdot 8 \cdot 4 \cdot 16 \cdot 5 \cdot 32 \cdot 6 \cdot 64 \cdot 7$$

4	12	32	80	192	448	1024	2304
8	20	48	112	256	576	1280	
12	28	64	144	320	704		
16	36	80	176	384			
20	44	96	208				
24	52	112					
28	70						

$$n(n-1)2^{n-3}$$

2	3	4	5	6	7	8	9
4	12	32	80	192	448	1024	2304
3	8	20	48	112	256	576	

$$3 \cdot 2 \cdot 4 \cdot 6 \cdot 5 \cdot 16 \cdot 6 \cdot 40 \cdot 7 \cdot 96$$

$$6 \cdot 8 \cdot 3 \cdot 10 \cdot 8$$

$$6 \cdot 24 \cdot 80 \cdot 240 \cdot 672 \cdot 1792$$

$$18 \cdot 56 \cdot 160 \cdot 432 \cdot 1120$$

$$1 \cdot 8 \cdot 4 \cdot 160$$

$$n, a+2a, a+2a+5a, a+2a+5a+12a, a+2a+5a+12a+28a$$

12	20	28	38	104	272	688
56	66	168	416			
104	102	248				
160	146	4				
272	198					
416						
688						

$$a, a+2a, a+2a+4a$$

64	28	12	5	2
36	16	7	3	
20	9	4		
11	5			

$$2 \cdot 4 \cdot 8 \cdot 16 \cdot 32 \cdot 64$$

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$12 \cdot 28 \cdot 36 \cdot 44 \cdot 52$$

$$\frac{4 \cdot 3 \cdot 2}{5 \cdot 4 \cdot 4}$$

$$n \cdot (n-1) 2^{n-3}$$

$$6 \cdot 3 \cdot 2$$

$$6 \cdot 5 \cdot 8 \cdot 7 \cdot 8 \cdot 16$$

$$n2^{n-2}$$

$$n2^{n-2}$$

$$n2^{n-2}$$

$$42$$

$$32$$

$$4 \cdot 12$$

$$672$$

$$\begin{aligned}
 x^6 &= 720 m^6 - 480 a m^5 - 120 a^2 m^4 + 320 a^3 m^3 + 160 a^4 m^2 + 48 a^5 m - 120 m^3 - 80 a m^2 - 48 b m - 16 c m^2 + 24 m^2 + 20 a m^2 + 16 b m^2 + 12 c m^2 + 4 d m - 2 m - 2 a m - 2 b m - 2 c m - 2 d m - f \\
 x^5 &= 128 m^5 - 160 a m^4 - 48 a^2 m^3 + 80 a^3 m^2 + 48 a^4 m + 16 b m^2 - 20 m^2 - 16 a m^2 - 12 b m^2 - 4 c m^2 + 2 m + 2 a m + 2 b m + 2 c m + 2 d m \\
 x^4 &= 48 m^4 - 48 a m^3 - 16 a^2 m^2 + 16 a^3 m + 12 a^4 m + 4 b m^2 - 2 m - 2 a m - 2 b m \\
 x^3 &= 16 m^3 - 12 m^2 - 4 a m^2 + 2 m + 2 a m \\
 x^2 &= 4 m^2 - 2 m
 \end{aligned}$$

$$\begin{aligned}
 &\frac{(n-1)(2m)^n - n(n-1)(2m)^{n-1}}{1 \cdot 2} + \frac{n(n-1)(n-2)(2m)^{n-2}}{1 \cdot 2 \cdot 3} - \frac{n(n-1)(n-2)(n-3)(2m)^{n-3}}{1 \cdot 2 \cdot 3 \cdot 4} \\
 &\frac{-a(n-2)(2m)^{n-1} + a(n-1)(n-2)(2m)^{n-2}}{1 \cdot 2} - \frac{a(n-1)(n-2)(n-3)(2m)^{n-3}}{1 \cdot 2 \cdot 3} \\
 &\quad + \frac{6(n-3)(2m)^{n-2}}{1} - \frac{6(n-2)(n-3)(2m)^{n-3}}{1 \cdot 2}
 \end{aligned}$$

$0 \quad 0 \quad 4 \cdot 16 \cdot 48 \cdot 128$
 $n \quad 2 \cdot 2 \quad 4 \cdot 4 \quad 6 \cdot 8 \quad 8 \cdot 16$

$(n-2)2^{n-1} - \frac{c(n-4)}{1}$

$(n-3)2^{n-3}$
 $(n-4)2^{n-3}$

$(n-1)(n-2)2^{n-2}$
 $\frac{(n-1)(n-2)2^{n-3}}{2}$
 $\frac{(n-1)(n-2)2^{n-4}}{2}$
 $\frac{(n-1)(n-2)2^{n-5}}{2}$

$1 \cdot 2 \cdot 3 \cdot 4 \cdot 4 \cdot 12$
 $1 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 2 \cdot 4 \cdot 3 \cdot 4 \cdot 5 \cdot 4 \cdot 8$
 $\frac{(n-1)(n-2)2^{n-2}}{1 \cdot 2}$

$2 \cdot 16 \cdot 80$
 $12 \cdot 96 \cdot 480$
 $3 \cdot 2 \cdot 1 \cdot 2 \cdot 4 \cdot 3 \cdot 2 \cdot 4$

$1 \cdot 4, 2 \cdot 8, 3 \cdot 16, 4 \cdot 32$

$(n-2)2^2$
 $(n-2)2^3$
 $(n-2)2^4$
 $(n-2)2^5$

$5 \cdot 4 \cdot 3 \cdot 8$
 $\frac{(n-2)(n-3)2^{n-3}}{2}$
 $3 \cdot 7 \cdot 4$
 $2 \cdot 7 \cdot 8$
 $2 \cdot 2$
 $\frac{2 \cdot 1 \cdot 2}{2}$

$$\begin{array}{r} a+b=1 \\ 2a+b=64 \\ \hline a=63 \\ b=-62 \end{array}$$

$$\begin{array}{r} 3a+b=929 \\ 4a+b=4096 \\ \hline a=3367 \end{array}$$

$$\begin{array}{r} 12668 \\ 8972 \\ \hline 4096 \end{array}$$

$$\begin{array}{r} 3a=10501 \\ 929 \\ \hline b=-9372 \end{array}$$

$$\begin{array}{r} 5a+b=18625 \\ 6a+b=46656 \\ \hline a=31031 \end{array}$$

$$\begin{array}{r} 5a=155155 \\ 18625 \\ \hline b=-139530 \end{array}$$

$$\begin{array}{r} 7a+b=117649 \\ 8a+b=262144 \\ \hline a=144495 \end{array}$$

$$\begin{array}{r} 7a=1011465 \\ 117649 \\ \hline b=-893816 \end{array}$$

$$\begin{array}{r} 9a+b=531441 \\ 10a+b=1000000 \\ \hline a=468559 \end{array}$$

$$\begin{array}{r} 10a=4685590 \\ 1000000 \\ \hline b=-3685590 \end{array}$$

$$\begin{array}{r} 11a+b=1771561 \\ 12a+b=2955984 \\ \hline a=1214423 \end{array}$$

$$\begin{array}{r} 11a=13358653 \\ 1771561 \\ \hline b=-11587092 \end{array}$$

$$\begin{array}{r} 13a+b=4826809 \\ 14a+b=7529536 \\ \hline a=2702727 \end{array}$$

$$\begin{array}{r} 13a=35135451 \\ 4826809 \\ \hline b=-30308642 \end{array}$$

$$\begin{array}{r} 15a+b=11790625 \\ 16a+b=16777216 \\ \hline a=5386591 \end{array}$$

$$\begin{array}{r} 15a=80798865 \\ 11790625 \\ \hline b=-69408240 \end{array}$$

$$\begin{array}{r} 17a+b=24137569 \\ 18a+b=34012224 \\ \hline a=9874659 \end{array}$$

$$\begin{array}{r} 17a=167869135 \\ 24137569 \\ \hline b=-143738566 \end{array}$$

$$\begin{array}{r} a+b+c+d+e+f+g=62 \\ 64a+32b+16c+8d+4e+2f+g=9372 \end{array}$$

$$729a+243b+81c+27d+9e+3f+g=139530$$

$$4096a+1024b+256c+64d+16e+4f+g=893816$$

$$15625a+3125b+625c+125d+25e+5f+g=365590$$

$$46656a+7776b+1296c+216d+36e+6f+g=11587092$$

$$117649a+16807b+2401c+343d+49e+7f+g=30308642$$

$$63a+31b+15c+7d+3e+f=9310$$

$$669a+211b+65c+19d+5e+f=130158$$

$$3367a+781b+175c+37d+7e+f=754286$$

$$11529a+2101b+369c+61d+9e+f=2791774$$

$$31031a+4651b+671c+91d+11e+f=7901502$$

$$79999a+9031b+1105c+127d+13e+f=18721550$$

$$602a+180b+50c+12d+2e=120548 \quad e=2$$

$$2702a+570b+110c+18d+2e=624128$$

$$8162a+1320b+194c+24d+2e=2037488$$

$$19502a+2550b+302c+30d+2e=5109728$$

$$39962a+4380b+434c+36d+2e=10820048$$

$$2100a+390b+60c+6d=503280$$

$$5460a+750b+84c+6d=1413360 \quad d=12$$

$$11340a+1230b+108c+6d=3072240$$

$$20460a+1830b+132c+6d=5710320$$

$$3360a+360b+24c=910080 \quad c=320$$

$$5880a+480b+24c=1658880$$

$$9120a+600b+24c=2638080$$

$$2520a+120b=748400 \quad b=480$$

$$3240a+120b=979200$$

$$720a=230400$$

$$12a=3840$$

$$a=320$$